CHEVROLET, FORD OWNERS' REPORTS

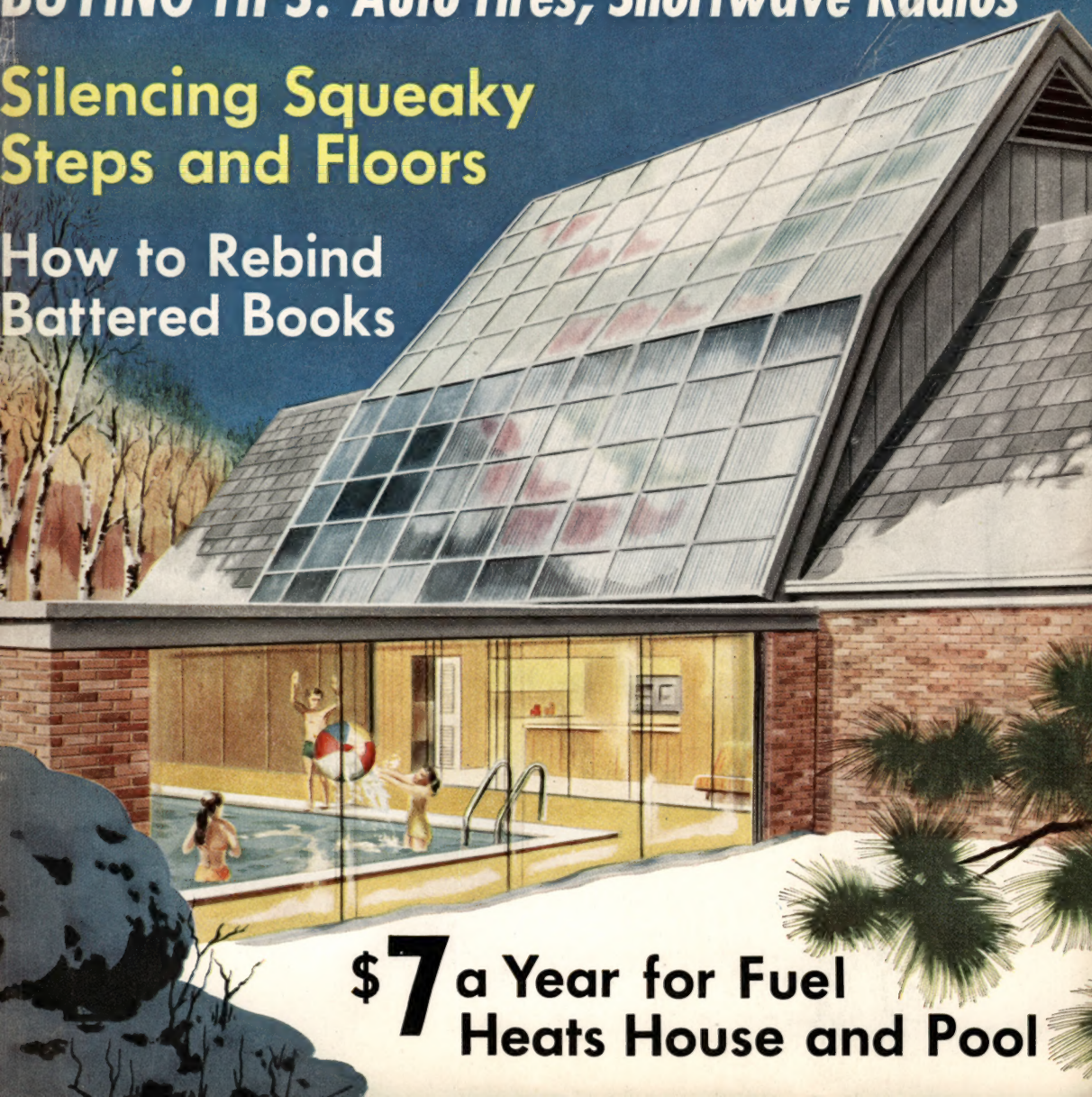
POPULAR MECHANICS

FEB. 1965
35 CENTS

BUYING TIPS: Auto Tires, Shortwave Radios

Silencing Squeaky Steps and Floors

How to Rebind Battered Books



$7 a Year for Fuel Heats House and Pool

Miller High Life

The Champagne of Bottle Beer

Exceptional and unequalled on draught . . .
in familiar bottles or in cans.
A full bodied flavor with a deep-down goodness,
sparkling with a special lightness
. . . distinctive! The Champagne of Bottle Beer.

Miller
HIGH LIFE

Brewed ONLY in Milwaukee!

© 1965 MILLER BREWING CO

Analyzing car sounds in anechoic chamber helped Ford Motor Company build luxury-quiet quality cars. Keep this quality with Quality Car Care at your Ford or Lincoln-Mercury Dealer.

Ford Motor Company builds quality in – Quality Car Care keeps it in

QUALITY CAR CARE

Ford and Lincoln-Mercury Dealer mechanics receive thorough factory training. These mechanics also have special tools and equipment, genuine parts.

Take your car where it belongs for service. It needs so little care it deserves the best. That means Quality Car Care—at your Ford or Lincoln-Mercury Dealer.

Take your car where it belongs...to your
FORD or LINCOLN-MERCURY DEALER

Ford MOTOR COMPANY

Champions use Champions!

Jim Hall wins the U.S. Road Racing Championship in his Chevrolet-powered Chaparral – equipped with Champion spark plugs. Champions deliver maximum performance – regardless of make of engine. Why settle for less in your car?

DEPENDABLE
CHAMPION
SPARK PLUGS

To feel new power, instantly, install new Champions now and every 10,000 miles

Panel a dull wall this weekend-

for less than $50.

Say you've got about an 8′ x 12′ wall. You can panel it like an expert with Western Wood paneling. This isn't some sheet material. This is the real thing. With a real feel to it.

It's easy to work. Easy to nail. And easy to saw. Individual pieces fit around openings better. (One slip on a large sheet and goodby whole sheet.) Put it up horizontally, vertically or in a herringbone pattern. For a formal effect use a clear grade or uniform widths. Random widths look informal. Knotty grades are more casual.

Finish it to suit yourself. Western Wood paneling takes stain or paint equally well. You can accentuate or subdue the grain pattern. Make light woods look like hardwoods.

See your dealer. Say, "I want to panel a wall with Western Wood for less than $50." He'll put together a kit that'll include everything.

Or ask him for a Western Woods booklet of paneling ideas. If he doesn't have one, mail us 10c and this coupon. We'll send you one.

Enclosed is 10c for the full-color booklet "What you can do with Western Wood Paneling."

Name_____

Address_____

City_____ State_____ Zip____

WWP

WESTERN WOOD PRODUCTS ASSOCIATION

Dept. PM-165, Yeon Building,
Portland, Oregon 97204

POPULAR MECHANICS®

FEBRUARY 1965

VOL. 123 NO. 2

575 LEXINGTON AVE.
NEW YORK, N.Y. 10022

INTERNATIONAL EDITIONS • AUSTRALIAN • SPANISH • CARIBBEAN • FRENCH • DUTCH

Features of Special Interest

$7 a Year Heats and Airconditions Solar Houses . . 89
Owners Report on Their 1965 Chevrolets 94
The 1965 Fords: How Owners Rate Them 100
Old-Time Sport in a Fiberglass Shell 106
Is Aviation Going Automatic? 110
Tips on Buying Shortwave Receivers 116
Our First Moon Scout Heads for the Pad 126
Frigid Fun for Skin Divers 140
New Weapons for Hot Little Wars 144
The Gun That Does Everything 148
Life-Saver in Your Glove Compartment 196
$5 Thermostat Alarm Sounds Cold Warning . . . 198

For the Workshop Craftsman

Remote Wind Indicator Inside Your House 150
Rebinding Battered Books 156
Humpty Dumpty Children's Game 165
Coffee Table Chest 166
Washtub Bass Fiddle 169
Silencing Squeaky Steps and Floors 173
Let Your Spark Plugs Analyze Your Engine 179
Sabre Saw Compressor 186
Brazing Fixtures for Bandsaw Blades 188
Bright Ideas for Amateur Electricians 189
Heavy-Duty Shop Vacuum Cleaner 190
Mill Keyways in Your Lathe 194

Regular Departments

Over the Editor's Desk 8
Science Worldwide 12
News from the Services 22
Sidelights on Aviation 28
Items from All Outdoors 30
Spotlight on the Excalibur SS 32
Noteworthy New Inventions 36
Shopping for Tools 38
New on the Market 48
Detroit Listening Post 52
Clinic for Homeowners 56
Worth Writing For 60
What's New for Your Home 124
Solving Home Problems 162
New for Camera Buffs 170
Hints from the Readers 172
Auto Clinic 184
New in Electronics 200

NEXT MONTH: ***What's New in Boats*** and outboards (and everything nautical)—including *PM*'s own saucy speedster you can build for $25. March *PM* also brings you the new look in keyless locks; what owners think of the new Dodge and Olds; fresh ideas for carefree home maintenance and a top collection of projects

PORTUGUESE • DANISH • SWEDISH

DON DINWIDDIE
Editor

RICHARD E. DEEMS
President, Magazines Division

JOSEPH F. KERN
Publisher

RICHARD F. DEMPEWOLFF
Executive Editor

JOHN A. LINKLETTER
Managing Editor

Published by Hearst Corp., RICHARD E BERLIN, *Pres.*

WAYNE C. LECKEY . . *Shop Crafts Managing Editor*
CLIFFORD B. HICKS . . . . . *Midwest Editor*
520 N. Michigan Ave., Chicago, Ill. 60611
THOMAS E. STIMSON . . . . . *Western Editor*
3460 Wilshire Blvd., Los Angeles, Calif. 90005
HENRY NEHRBASS . . . . . *Art Director*
KEVIN V. BROWN . . . . . *Aviation Editor*
ED NELSON . . . . . *Automotive Editor*
LARRY STECKLER . . . . . *Electronics Editor*
ALFRED W. LEES . . . . . *Home Workshop Editor*
ARTHUR MIKESELL . . . . . *Boating Editor*
JOHN F. PEARSON . . . . . *Science Editor*
STUART JAMES . . . . . *Outdoors Editor*
ALEX MARKOVICH . . . . . *Associate Auto Editor*
FRANK X. SMITH . . . . . *Production Editor*
ART MAHER, ROBERT BERGER . . . *Associate Editors*
MURRAY COOPER . . . . . *Art Editor*
LEO WEEKS . . . . . *Assistant Art Director*
FRANK P. FRITZ . . . . . *Chief Photographer*
GARRY WINTER . . . . . *Book Editor*

•

ADDRESS COMMUNICATIONS TO: 575 Lexington Ave., New York, N.Y. 10022. For additional sources of information on the articles in this issue, or the name and address of the manufacturer of a particular product, write to Bureau of Information, *Popular Mechanics* for free "Where-to-Find-It-List."

L. PARK BENJAMIN, *Advertising Director*

ADVERTISING OFFICES: New York: 575 Lexington Ave., MUrray Hill 8-8500; Chicago: 520 N. Michigan Ave., 527-2400; Detroit: General Motors Bldg., TRinity 5-8711; Cleveland: Hanna Bldg., 1422 Euclid Ave., PRospect 1-0456; Los Angeles: 3460 Wilshire Blvd., DUnkirk 2-8458; San Francisco: 1101 Hearst Bldg., YUkon 2-0823.

SUBSCRIPTION SERVICE: Mail all subscription orders, changes of address, correspondence concerning subscriptions, and Postmaster notices of undeliverable copies to *Popular Mechanics*, 250 West 55th St., New York, N.Y. 10019.

•

Popular Mechanics is published monthly by **The Hearst Corporation**, 57th St. at 8th Ave., New York, N.Y. 10019, U.S.A. Richard E. Berlin, President; George Hearst, V-Pres.; Richard E. Deems, President of Magazines; John R. Miller, V-Pres. and Gen Mgr. of Magazines; G. Harry Chamberlaine, V-Pres. for Research and Marketing; William S. Campbell, V-Pres. and Director of Circulation; Joseph F. Kern, V-Pres. for **Popular Mechanics**; Frank Massi, Treasurer R. F. McCauley, Sec'y. Single copy in the United States and Canada, 35 cents. Subscription prices: United States and Possessions, $4.00 for one year; $7.00 for two years; $10.00 for three years. Canada, add $0.50 for each year. Pan American Postal Union countries, add $1.00 for each year. All other countries, add $2.00 for each year. **When changing address, give old address as well as the new, with postal-zone number, if any, and allow six weeks for change to become effective.** Second-class postage paid at New York, N.Y., and at additional mailing offices. Authorized as second class mail by the Post Office Department, Ottawa, and for payment of postage in cash. Registered as Second Class matter at the Post Office at Mexico, D.F., Mexico, June 20, 1950.

©1964 by The Hearst Corporation. All rights reserved. Printed in U.S.A.

Sam Hanks, Indianapolis "500" champion and driving safety expert says—

"Monro-Matic® shocks are my choice for extra safety on the speedway or highway"

"Monro-Matic® Shock Absorbers carried me to victory in the Indianapolis '500'—have brought in every 'Indy' winner for the past 12 years. Where lives are at stake, you can't afford to settle for less than the very best in shock absorber quality. Monro-Matics are the shocks you should have on your car, to make wheels grip the road better, to give you full control, to give you and your family maximum driving safety."

Have Monro-Matic shocks installed today in less than 30 minutes where you have your car serviced.

MONROE®

World leader on highway and speedway

MONROE AUTO EQUIPMENT COMPANY • Monroe, Mich.
In Canada, MONROE-ACME, LTD., Toronto, Ont.
In Mexico, MEX-PAR, Box 28154, Mexico City

NEW FRENCH GLASSES LET YOU SEE FISH ~~BELOW~~ SURFACE OF WATER!

View without Lunette Glasses

Same view with Lunette Glasses

An amazing new invention hit the world 2 years ago, when the first "Lunette Radar" glasses were brought in from France. For the first time, this amazing invention gave fishermen an easy, inexpensive way to see **below** the water surface . . . to spot fish . . . to let a fisherman see what he's doing instead of fishing "blind."

Invented and introduced in Europe, these sensational glasses sold so fast we **never** caught up with the demand. They were written up in one of New York's great newspapers—but with almost no publicity and very little advertising, we were sold out:

GREATEST NEW FISHING INVENTION

What made these glasses the **most-wanted** fishing aid of the year? First, the obvious fact that fishermen can now—for the first time—see below the surface **as they fish**—with no cumbersome equipment or gadgets.

You just slip these Lunette Radar glasses on—and water that you can't see into at all with the naked eye becomes clear—so you can see for at least 2 ft. to 12 ft. (or more) below the surface!

See photo illustrations above. These were taken with a **camera lens.** With the human eye, you will see even better! Even with a camera, though, you can see how water reflects glare. Without glasses, you see **only** the surface. Put these Lunette Radar Glasses on and you see below the surface! Now fishermen can see fish before they bite. Now you can bring your line close to the fish and watch the movement of line and lure . . . now you can see your line and lure working . . . now you can take your line in faster because you can see fish take your bait. **NOW YOU CAN FISH "SMARTER"—NOW YOU CAN TAKE MORE FISH—EVERY TIME.** With Lunette Radar glasses, you save precious fishing time. You see into holes—even in swift-running streams. You see through brush-piles, weeds—down into lakes, ponds and salt water.

And you do this with both hands free—with complete comfort and freedom of movement. Now you can bank on more fishing, more pleasure, more enjoyment as you study marine life underwater, learn what goes on beneath the area you fish.

RUSH ORDER—DON'T BE DISAPPOINTED

This year, we have brought in a sizeable supply of Lunette Radar Glasses. We are prepared to fill your order now. But we can't estimate the demand. Orders will be shipped on first-come, first-served basis. So—send coupon now to be sure you get your pair **early**—before the season starts. These famous glasses are **now only $7.95 a pair, plus 50¢ pp. & hdlg. Two pair, only $15 postpaid. You may order either with ear-piece as shown—or clip-on style to wear over other glasses.** We guarantee you will be pleased to own them as thousands of other fishermen have been. If you are not 100% thrilled with them after one fishing trip, return them for an immediate refund.

Rush coupon below to order now for the greatest fishing year you ever had!

HI-BRITENESS INSPECTION LIGHT

Beams Light Wherever You Want It

$3.95 postpaid

Flexible shaft bands, twists or turns to throw light into tiniest crevices—around curves, into corners—or beams it into holes. Indispensable help for mechanics, appliance repair men, locksmiths, hobbyists, TV and radio repairmen—doctors, dentists and housewives, too! Overall length, 11". Operates on 2 C batteries (not included). Case is durable ivory plastic, bulb is type 222 penlite. Handiest gadget ever—and only $3.95 postpaid.

PERMANENT MATCH

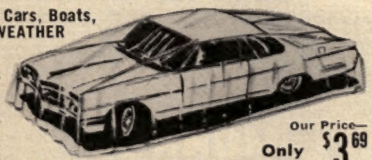
Lights Up to 10,000 Times

Ingenious match lasts for many years. Just pull it out of its slim case, strike on the side . . . it's lit! Replace into case to extinguish. Guaranteed to light up to 10,000 times. Only 1¾" high, featherlight. Metal construction. Has its own small ring for easy attachment to any key chain. You always have a light in any weather.

69¢ ea.
2 for $1.25

HEAVY-DUTY PORTABLE GARAGE

12x25 Ft. Protects Cars, Boats, Trucks From ALL WEATHER



Slips onto any car or boat to give all-weather protection. Made of heavy-gauge durable clear plastic. Waterproof, weatherproof, resists tears and scuffs. Huge 12x25 ft. size fits every make of car, station wagons, panel trucks, etc. Protects in coldest weather. Tested to 60 deg. BELOW ZERO! Folds easily when not in use—stores in trunk compartment. Saves cost of rust, repairs, repainting—useful for outdoor furniture, garden tools, etc. Now take your car or boat protection wherever you go. AND SAVE MONEY! **ALSO AVAILABLE:** Super strength—double weight plastic with 6 grommets—**$5.95 plus 70¢ pp & hdlg.**

Our Price—
Only $3.69
plus 50¢ PP & Hdlg.

EMPIRE MDSG. CO. Tuckahoe, N. Y.

Imported Lock-Blade Knife

Flips open instantly and locks automatically to prevent accidental closing. Razor-sharp, tough stainless steel blade for reliable use and hard, long service. Money back if not satisfied. Please state age.

Only $1.98 postpaid

5½" OVERALL LENGTH
- Opens Instantly
- Tough & Sharp
- Stainless Steel • Blade Locks

MAIL THIS HANDY ORDER COUPON

EMPIRE MDSG. CO., Dept. PM-265
125 Marbledale Rd., Tuckahoe, N. Y.

Please send items listed below (or listed on the attached sheet) on a satisfaction guaranteed basis. I enclose pay't of $.....

.....

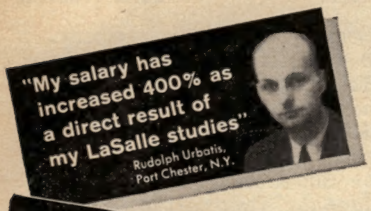
.....

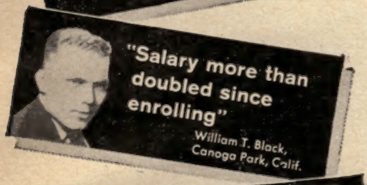
Name.....

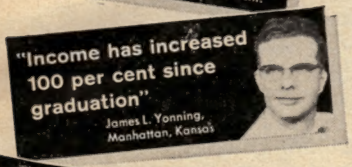
Address.....

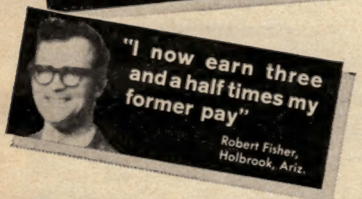
City.....State.....

WHO ELSE WANTS A BIG RAISE IN PAY?









Stuck in a rut? Tired of your dead-end job? Here's proof you can step up to a high-salary position with prestige and security through LaSalle spare-time training.

JUST LOOK at these enthusiastic reports. Have you ever seen anything like them? They are just a few of many hundreds of similar statements in letters that come from LaSalle students week after week, month after month, year after year.

LaSalle students have one ambition in common — to get out of the ranks of the untrained and earn big money, prestige and security in a key job. Isn't that your goal too?

Without interfering with your present work — and by devoting only a little of your spare time — you too can qualify rapidly for advancement in the field of your choice through LaSalle home study. The cost is surprisingly low.

LaSalle has been an acknowledged leader in home education for more than half a century. It has provided training in business, high school and technical subjects to more than 1,000,000 ambitious men and women. Its distinguished faculty includes some of the country's most outstanding authorities. That is why your LaSalle diploma is recognized and respected by employers.

Check the subject you are interested in — then send the coupon below for FREE booklet. No obligation. Mail to LaSalle, 417 South Dearborn, Chicago, Illinois 60605.

(Confidential — please answer all questions)

LA SALLE EXTENSION UNIVERSITY

A Correspondence Institution • **417 South Dearborn, Dept. 38-038, Chicago, Illinois 60605**

I have answered the questions in this confidential questionnaire. Please send me full information on how I may prepare for a choice position in the field I have checked below.

MY NAME.....

ADDRESS.....

CITY & ZONE.....STATE.....

COUNTY.....AGE.....

EDUCATION: *(Fill in number of years completed)*

Grammar School.....years
High School.....years
College.....years
Other.....years

PRESENT EMPLOYMENT:

Kind of position.....

Hours of work.....A.M. to.....P.M.

GENERAL INFORMATION:

☐ Single ☐ Married

Estimated spare hours per week available for study .....

ACCOUNTING
- ☐ Complete Accounting with CPA Training
- ☐ Complete Accounting
- ☐ Federal Income Tax
- ☐ Accounting Systems
- ☐ Auditing Procedure
- ☐ Controllership
- ☐ CPA Training
- ☐ Modern Bookkeeping

LAW COURSES
- ☐ Bachelor of Laws Degree
- ☐ Business Law
- ☐ Insurance Law
- ☐ Claim Adjusting Law
- ☐ Law for Police Officers
- ☐ Law for Trust Officers

SALESMANSHIP
- ☐ Sales Training

BUSINESS MANAGEMENT
- ☐ Complete Business Management
- ☐ Credit and Collections
- ☐ Office Management
- ☐ Personnel Management
- ☐ Business Correspondence

STENOTYPE
- ☐ Machine Shorthand

TRAFFIC AND TRANSPORTATION
- ☐ Complete Traffic Management
- ☐ Rate and Tariffs
- ☐ Agency and Services
- ☐ Motor Truck Traffic

DRAFTING
- ☐ Basic Drafting
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Architectural Drafting
- ☐ Structural Drafting
- ☐ Aeronautical Drafting

REAL ESTATE
- ☐ Complete Real Estate
- ☐ Real Estate Brokerage
- ☐ Real Estate Management
- ☐ Real Estate Sales

TECHNICAL COURSES
- ☐ Auto Body Repair
- ☐ Refrigeration
- ☐ Air-Conditioning
- ☐ Diesel
- ☐ Welding
- ☐ Motor Tune-up

HIGH SCHOOL
- ☐ High School Diploma
- ☐ Vocational Course

343 Canadian Residents, write: LaSalle, Box 1001, Montreal 3, Quebec

Over the Editor's Desk

It's Not Hot

I think that your T-18 story (*First All-Metal Plane Anyone Can Build*, page 80, December *PM*) fits the situation very well.

However, I will not be content to let any of my designs be thought of as "hot" in the sense that they might require exceptional skill to fly safely. It is true that Bill Warwick's T-18 does stall abruptly without warning and does fall to the left before it pitches down. Both characteristics are contrary to my philosophy of safe flight behavior.

If the next T-18 to fly shows up with similar behavior, I will make design changes to:

1. Provide aerodynamic buffet prior to stall;
2. Cause a pitch down at stall;
3. Provide no roll at stall; and
4. Make the ailerons always effective beyond stall.

Burbank, Calif. JOHN W. THORP

My compliments on a well-written article on the T-18.

So many times facts and figures get transposed or distorted from negligence on the part of the writer and builder that most "we fly" information should be accepted with tongue in cheek. It was therefore a great pleasure to read your story without having to blush from false claims.

Torrance, Calif. BILL WARWICK

Add-On Rifle Barrels

In your interesting article, *That Antique Gun . . . Fortune or Forgery?* (page 138, November *PM*), you tell of one man who bought a Kentucky long rifle that looked genuine, but when the gun was cleaned, "the collector found that it was really made up of two barrels welded together to make one long one."

One gun authority says that in making a Kentucky long rifle, the barrel was forged by wrapping a strip of hot iron spirally around a rod—then heating and hammering it until it was welded into a tube. He adds that in order to get them off the mandrel, barrels had to be made in two short lengths and welded together afterwards.

So perhaps the long rifle in question is actually genuine after all. I hope so.

I have seen several genuine specimens, one of which is said to have been taken to England by a Tory recruiting officer to show the English what they would be up against when fighting the "rebels" over here. Recruiting is said to have fallen off quite a bit.

Northport, N.Y. DABNEY HORTON

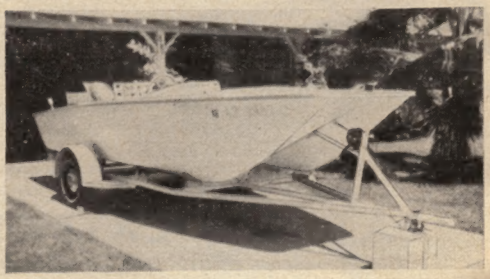
The rifle was pretty certainly a fake. In commenting on Reader Horton's letter, Mr. T. E. Hall, curator of the Winchester Gun Museum, said, "The Kentucky rifle mentioned in the article did have two different barrels welded together, for the rifling of the two sections did not match. The lugs under the front part of the barrel had been moved to accommodate the cross pins holding it to the original stock."

(And it seems to us that those Tory recruiters would've done better to claim that the rebs were using slingshots.)

Just What He Wanted

The *Sports Sled* (p. 144, March '64 *PM*) was just what we had been looking for. Only this type of boat, with its large cockpit area, could fulfill our needs, and I decided almost immediately to build it.

This was my first attempt to build a



boat, and I found it to be an enjoyable and rewarding experience.

I started the frames on April 16, and after a considerable number of delays in ordering hardware and having a welder build a trailer, we launched the completed boat on August 1.

We have received many compliments on this boat and we are very proud of it.

Scottsdale, Ariz. LESTER DEAN

They're Not Just Sitting

In the article, *Don't Just Sit There!* (page 84, November *PM*), your figures show that nurses and college students, each walking 4.7 miles, are second only to mailmen in distance walked per day.

I'm a saleswoman in a department store on Fifth Avenue in New York, and I sell on an entire floor. I wore a pedometer and I found I averaged seven miles a day.

New York City DONNA FRANCES CLARK

I question the statement: "the average mailman walks 22 miles per day." On an

(Please turn to page 10)

Take Security and Top Pay For Granted! Get into REFRIGERATION, AIR CONDITIONING and HEATING

Learn RIGHT AT HOME in your SPARE TIME!

YOU LEARN BY DOING!

You Build This Complete Refrigeration System YOURSELF!

Learn as you build . . . practice with 25 kits of parts and tools (all included with the course). Follow the easy instructions and, in just a short time, you build a complete refrigeration system that you can convert into an air-conditioner, freezer or refrigerator!

Mail the Coupon below and we'll rush you—absolutely FREE—a valuable book of facts about the big, top-paying job opportunities in the booming field of refrigeration, air conditioning and heating.

This promising business is now a multi-billion dollar industry that's demanding more than 20,000 NEW mechanics every year—jobs that offer good money and real security.

Learn at Home in Your Spare Time

Everything you need to become a skilled specialist in refrigeration, air conditioning and heating will be sent to you. You can study without leaving home, and without giving up your present job. Trained instructors stand by to help you when you need it.

A BETTER JOB—A Business of Your Own!

As you read your Free Book, you'll see how many graduates now operate profitable businesses of their own. Many take high-paying jobs with dealers, distributors or contractors. Many use their new skills as a source of extra part-time income. The choice is up to you.

Thousands Find Success and Security

"I helped install 175 tons of equipment in a shopping center; 3 central AC and heating units in new homes; and 17 room units. Not bad for a student."—James Voss, Tex. "Your course opened a new world of opportunity. I have 3 job offers to choose from."—Thomas O'Connor, New York. "I've earned $400 more than I paid for the course. Am now self-employed."—James Rosado, S. Car. (You'll find many more letters like these in your Free Book.)

AND STILL MORE OPPORTUNITIES IN . . .

Auto Mechanics! Free 32-page book, "Make Big Money in Auto Mechanics." Easy to read.

Television Servicing! Free 20-page book, "You and Your Future in Color Television."

Building Construction! Free 30-page book, "Your Future in Building Construction."

Industrial Electronics! Free 20-page book tells you how to get started, how to keep going.

If coupon has been removed, write to:
COMMERCIAL TRADES INSTITUTE
Chicago, Illinois 60626

ACT NOW—MAIL THIS COUPON AT ONCE —NO OBLIGATION

COMMERCIAL TRADES INSTITUTE
1400 Greenleaf Avenue
Chicago, Illinois 60626 Department R-364

FREE! No Obligation

Check one

- ☐ Rush me your FREE Book, "Be a Success in Air Conditioning, Refrigeration and Heating" and Sample Lesson
- ☐ Free Auto Mechanics Book ☐ Free Industrial Electronics Book
- ☐ Free Television Servicing Book ☐ Free Building Construction Book (Black-&-White & Color)

NAME _____ AGE _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Accredited Member National Home Study Council

Blue-print for action

Yellow Pages will show you where to get architects, contractors, masons, plumbers, carpenters...anyone. Just let your fingers do the walking. Action-People do.

Over the Editor's Desk

(Continued from page 8)

average foot route in Seattle, my supervisor estimates we walk 10 to 12 miles delivering mail. We spend a minimum of three hours preparing our mail—leaving at least four hours to deliver it.

As three miles per hour would be a fast pace for distributing mail, the "average postman" in your article must spend his entire day walking on his route.

Seattle, Wash. LEIGH WHITFORD

Well, the "average postman" in Wilmette, Ill. (where Scholl Manufacturing Co. conducted its tests) seems to spend most of his day walking, the folks at Scholl tell us. But the national average for a residential letter carrier is 12 miles, according to the U.S. Post Office Dept.

Father and Son's PM-38

My father and I built PM-38 (page 140, August 1962 *PM*) and found it to be a great performer.

We were able to haul four skiers quite easily with a 40-horsepower engine. The

boat planes quickly and has great turning ability. However, we found the use of a fin quite unnecessary on sharp turns.

I'm sure we have many years of enjoyment ahead with PM-38. Congratulations, on a fine design.

Renton, Wash. DOUG JAYNE

Reclining Files?

This is the second issue of PM *to carry an article indexed on the backbone of the magazine. We thought this would be a useful reminder for you home craftsmen who like to stack your copies. But do you like to stack them horizontally or vertically? As you can see, we're assuming you pile them up horizontally. You might let us know your preference.*

The Editors

BLITZKRIEG! The event that changed all our lives, revealed with a clarity impossible at the time!

Under wily Rommel, the "Desert Fox," the Germans blitzed across a continent.

Nazi Blitzkrieg made Europe a captive fortress. LCVP survivors off Omaha Beach.

At last Allies took *their* brand of "lightning war" into heartland of Germany.

Meanwhile, across the globe, Japanese launched their own Blitzkrieg at Pearl Harbor.

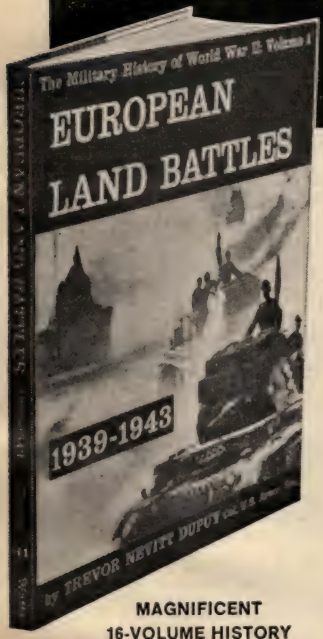
May We Send You

FREE

This Thrilling First Volume of the New 16-Volume

MILITARY HISTORY OF WORLD WAR II

They called it the "phony war." Then "sitzkrieg" became "blitzkrieg." Hitler's divisions blitzed country after country! Here is the whole story—12,000 words, 47 photos, 10 battle maps.



MAGNIFICENT 16-VOLUME HISTORY

"Blitzkrieg—Lightning War," they called it. And like lightning, World War II burst upon an astonished, virtually defenseless world, turning city after city into rubble, and leaving behind a tangle of events for some future historical work to resolve.

The monumental new MILITARY HISTORY OF WORLD WAR II *is* that work.

Written with access to newly-opened archives of victor and vanquished, enriched by dozens of specially-created maps and hundreds of gripping photos (many published for the first time) it reveals at last the global conflict—as heretofore known only by *Supreme Commanders and heads of state.*

This fascinating new 16-volume home library—now available on an easy book-a-month plan—makes you an eyewitness to the mapping of invasions by Allied and Axis strategists. It puts you in battlefront command dugouts and guerrilla nests, in submarines and Flying Fortresses. It discloses information held "Top Secret" almost 20 years.

You learn how Gen. Mark W. Clark escaped capture on a cloak-and-dagger mission—by swimming to a submarine. *Had Clark been taken, Allied invasion plans might have been foiled!*

You discover why Hitler stopped short of occupying all of France. *Had he driven on, he might have seized North Africa without a shot!*

You "island-hop" in the Pacific . . . and learn the factors behind our decision to drop the atom bomb on an already doomed Japan!

Volume One—Your FREE Introduction

Judge for yourself the value of this new continuing reading adventure. Accept Vol. 1, "European Land Battles, 1939-1943," ABSOLUTELY FREE! Then each month you will receive another volume—always at the special low Charter Subscriber's price of $1.95 plus a small mailing charge, instead of the publisher's catalog price of $2.50. You are not obligated to take any minimum number of volumes—take as many or as few as you like, cancel membership any time. In any case, Vol. 1 will be yours to keep as our gift.

But act now. First edition sets are limited. It will be many months before we go back to press. To insure getting *your* family's set of this permanent literary heirloom, mail Reservation Form today to: GROLIER ENTERPRISES INC., 845 Third Ave., New York, N. Y. 10022.

Col. Dupuy's MILITARY HISTORY takes the staggering body of World War II data and breaks it down by subject. Each of his 16 fascinating volumes deals with a self-contained unit of the War . . . reads as swiftly and suspensefully as a thriller. *Makes history come alive for every member of the family!* The first 5 titles:

1. EUROPEAN LAND BATTLES, 1939-1943
2. EUROPEAN LAND BATTLES, 1944-1945
3. LAND BATTLES: NORTH AFRICA, SICILY, ITALY
4. THE NAVAL WAR IN THE WEST: THE RAIDERS
5. THE NAVAL WAR IN THE WEST: THE WOLF PACKS

Similarly, Vols. 6 and 7 cover The Air War in the West; Vols. 8-10, Asiatic Land Battles; Vols. 11-14, the Naval War and the Air War with Japan; Vol. 15, The Resistance; Vol. 16, Summary.

ABOUT THE AUTHOR

Trevor Nevitt Dupuy

Scholar, researcher, military analyst, eminent historian, Col. Dupuy's best-selling Civil War histories have been widely praised by historians, critics, readers.

SEND NO MONEY—MAIL THIS TODAY!

GROLIER ENTERPRISES INC., Dept. SM
845 Third Avenue, New York, N. Y. 10022

Please send me "European Land Battles, 1939-1943," Volume One of THE MILITARY HISTORY OF WORLD WAR II, to keep without cost or obligation. I understand that each month you will send a new book of the 16-volume MILITARY HISTORY home library, which I may keep for the Charter Subscriber's special price of only $1.95 (plus a small mailing charge) instead of the publisher's catalog price of $2.50, or return to you in 7 days at your expense and owe nothing. I may cancel at any time, and you will send no more volumes after receiving my cancellation.

NAME _____ *(Please print)*

ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

SIGNATURE *(If under 21, have parent or guardian sign)* _____ PHONE _____

Olympics in '68. Mexico City's 7500-foot elevation probably won't affect the performance of unacclimatized sprinters but is likely to slow down distance men.

That's the opinion of Dr. Bruno Balke, University of Wisconsin researcher, who explains that the heart and lungs function at a maximum level during an endurance-type competition and therefore can't work harder to compensate for the fewer molecules of oxygen available at higher altitudes.

"Slightly subnormal performances," says Dr. Balke, "must be the consequence in events requiring maximum efforts in excess of one to two minutes' duration."

The ultimate in gas station attendants soon will be refueling jets at New York's Kennedy Airport. The attendant—a General Electric 412 process control computer—will automate the control of the flow of about a million gallons of aircraft fuel a day.

Red spots on the purple flower of a plant called spiderwort can measure radioactivity as accurately as most Geiger counters. Dr. L. W. Mericle of the University of Michigan developed the flower, a hybrid. You need a microscope to count the red spots, but their number reflects the level of radioactivity with an accuracy of 1/5000th roentgen.

Energy waves that have traveled 10 billion light-years may soon be picked up by France's new radio telescope, the largest of its type. It has a 1000-foot metal-network "mirror" to concentrate faint radio waves into measurable impulses. (A light-year is approximately equal to six million-million miles.)

Glass-blowing works, machine shop, aquariums and four different kinds of laboratories will all be part of a marine biology ship now being built for the Scripps Institution of Oceanography in California. Labs are for the immediate handling of sea creatures that can't be kept alive until the ship gets back home. And the shop and glass works are to support the labs and to perhaps improvise equipment as needed.

Listening post. U.S. scientists recently used a unique observatory—a small steel chamber equipped with hydrophones—to snoop on the Weddell seals living in McMurdo Sound in Antarctica. The chamber was suspended seven feet below the five-foot-thick covering of ice on the sound.

What did the scientists pick up with their hydrophones? "I've never heard such an underwater racket before," reported one of them. Though the Weddells keep mouth and nostrils tightly closed underwater, they are capable of making noises resembling whistles, buzzes, beeps and chirps.

Gadgetry Doesn't Win Science Fairs

If your son or daughter plans to enter a high-school science fair this spring, it might pay the youngster to consider some words of advice from an expert. A teacher at John Hopkins University and a former science fair finalist himself, he was a judge at last year's National Science Fair at Baltimore. Here's what he told this column:

"It takes scientists to make science, so I consider the student himself the most important part of the project. I want to learn the depth of the student's understanding and whether he is honestly seeking knowledge.

"I don't care if a student has a simple or complex project—it's what he's done with it that counts and what he can tell me about it in our interview.

"You can quickly detect those students who are there simply to win a prize—everything they've done is directed toward that end. What happens is a compulsion to produce results at any cost. As a result, the student will sometimes fake results.

"For instance, at this fair I saw a couple of experiments that were taken from texts. With the equipment exhibited, the student couldn't possibly have obtained the results he showed. Of course, I gave those exhibits no further consideration.

"Students should learn early the spirit of science, the intellectual honesty that science must be based on. That's why I liked one boy. He was candid enough to show results that were way out of line with his experiment. I promised him that I would come back after the judging was over and look at his calculations."

The Johns Hopkins scientist did just

(Please turn to page 14)

GET READY FOR THE SPACE and SCIENCE ERA! SEE SATELLITES, MOON ROCKETS CLOSE-UP

AMAZING SCIENCE BUYS for FUN, STUDY or PROFIT

NEW! SCIENCE FAIR PROJECT KITS

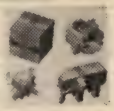
Edmund Kits are carefully planned to give any boy or girl the fun and excitement of discovering science facts. Such carefully planned projects can lead the student to awards or scholarships. Adults too will find them an excellent introduction to the various fields of science. **Write for Free Bulletin 47-H "Your Science Project" covering all phases of Science Fair projects.**

CRYSTAL GROWING KIT

Do a Crystalography project illustrated with large beautiful crystals you grow yourself. Kit includes the book "Crystals and Crystal Growing" and a generous supply of the chemicals you need to grow large display crystals of potassium aluminum sulfate (clear), potassium chromium sulfate (purple), potassium sodium tartrate (clear), nickel sulfate hexahydrate (blue green) or heptahydrate (green) potassium ferricyanide (red), and copper acetate (blue green).

Stock No. 70,336-H ..... **$9.50 Postpaid**

WOODEN SOLID PUZZLES



12 different puzzles that will stimulate your ability to think and reason. Puzzles, animals and geometric forms to take apart and reassemble, give a chance for all the family, young or old, to test skill, patience.

Stock No. 70,205-H ..... **$3.00 Postpaid**

SCIENCE TREASURE CHESTS

For Boys—Girls—Adults!

Science Treasure Chest—Extra-powerful magnets, polarizing filters, compass, one-way-mirror film, prism, diffraction grating, and lots of other items for hundreds of thrilling experiments, plus a Ten-Lens Kit for making telescopes, microscopes, etc. Full instructions included.

Stock No. 70,342-H ..... **$5.00 Postpaid**

Science Treasure Chest DeLuxe—Everything in Chest above plus exciting additional items for more advanced experiments.

Stock No. 70,343-H ..... **$10.00 Postpaid**

BUILD A SOLAR ENERGY FURNACE

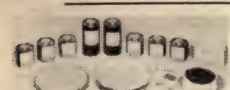
A fascinating new field. Build your own Solar Furnace for experimentation—many practical uses. Easy! Inexpensive! Use scrapwood! We furnish instructions. This sun powered furnace will generate terrific heat—2000° to 3000°. Fuses enamel to metal. Sets paper aflame in seconds. Use our Fresnel Lens 11" sq. F.L. 19".

Stock No. 70,533-H ..... **$6.00 Postpaid**

MINIATURE WATER PUMP

Wonderful for experiments, miniature waterfalls, fountains, HO gauge railroad backdrops, etc. Tiny (2⅝" x 1¾") electric motor and pump ideal for hobbyists, labs, schools. Pumps continuous flow of water at rate of one pint per minute at a 12" head. With 2 D Batteries in series will pump to 24" high. Runs 48 hrs. on battery. Works in either direction. Self-priming. **Stock No. 50,345-H** ..... **$2.25 Postpaid**

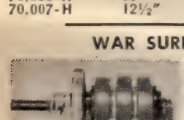
MAKE YOUR OWN POWERFUL ASTRONOMICAL TELESCOPE



Kits contain fine annealed pyrex mirror blank, tool, abrasives, diagonal mirror and eyepiece lenses. You build instruments ranging in value from $75.00 to hundreds of dollars.

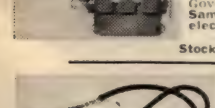
Stock No.	Diam.	Mirror Thickness	Price
70,003-H	4¼"	¾"	$ 7.50 ppd.
70,004-H	6"	1"	11.95 ppd.
70,005-H	8"	1⅜"	19.50 ppd.
70,006-H	10"	1¾"	30.75 f.o.b.
70,007-H	12½"	2⅛"	59.95 Barrington

WAR SURPLUS ELECTRIC GENERATOR



Brand new Signal Corps Electric Generator for scientific experiments, electrical uses, demonstrations. Generates up to 90 volts by turning crank. Use in high impedance relays. Charge ground and bring up night crawlers for bait or study. 2 Alnico Magnets alone worth original price. Wt., 2 lbs. Cost to Govt. $15. **Stock No. 50,225-H. $6.95 Pstpd. Same type generator, mounted, with light, as electricity demonstrator.**

Stock No. 50,365-H ..... **$11.95 Postpaid**



Diagnose Hidden Trouble with Professional Stethoscope

Designed for use by physicians, this super-sensitive stethoscope is ideally suited for detecting faults in machines and engines, and in fluid, air and gas leakage. Dozens of uses in auto repair shops, labs, hobby and educational applications.

Stock No. 50,270-H ..... **$6.95 Postpaid**

BARGAIN PRICE STETHOSCOPE—excellent value.

Stock No. 50,223-H ..... **$2.95 Postpaid**

ORDER BY STOCK NUMBER - SEND CHECK OR MONEY ORDER - SATISFACTION GUARANTEED

EDMUND SCIENTIFIC CO., BARRINGTON, N. J.

See the Stars, Moon, Planets Close Up!

3" ASTRONOMICAL REFLECTING TELESCOPE

60 TO 180 POWER!
Famous Mt. Palomar Type!
An Unusual Buy!

See the Rings of Saturn, the fascinating planet Mars, huge craters on the Moon, phases of Venus. Equatorial Mount with lock on both axes. Aluminized and overcoated 3" diameter high-speed f/10 mirror. Telescope comes equipped with a 60X eyepiece and a mounted Barlow Lense. Optical Finder Telescope included. Hardwood, portable tripod. FREE with Scope: **Valuable STAR CHART** plus 272-page "HANDBOOK OF HEAVENS" plus "HOW TO USE YOUR TELESCOPE" BOOK.

Stock No. 85,050-H ..... **$29.95 Postpaid**

4¼" REFLECTING TELESCOPE—Up to 255 Power.

Stock No. 85,105-H ..... **$79.50 F.O.B., Barrington, N.J.**

WAR SURPLUS AMERICAN-MADE 7x50 BINOCULARS

Big savings! Brand new! Crystal clear viewing—7 power. Every optical element is coated. An excellent night glass—the size recommended for satellite viewing. Individual eye focus. Exit pupil 7mm. Approx. field at 1,000 yds. is 376 ft. Carrying case included. American 7 x 50's normally cost $274.50. Our war surplus price saves you real money.

Stock No. 1544-H . . Only $74.80 Ppd. (tax incl.)
6 x 30 Binoculars—similar to above.
Stock No. 963-H . . . $33.00 Postpaid (tax incl.)
7 x 35 American Made Binoculars.
Stock No. 964-H . . . . . $60.50 Ppd. (tax incl.)

SOLVE PROBLEMS! TELL FORTUNES! PLAY GAMES!

NEW WORKING MODEL DIGITAL COMPUTER

ACTUAL MINIATURE VERSION OF GIANT ELECTRONIC BRAINS

Fascinating new see-through model computer actually solves problems, teaches computer fundamentals. Adds, subtracts, multiplies, shifts, complements, carries, memorizes, counts, compares, sequences. Attractively colored, rigid plastic parts easily assembled. 12" x 3½" x 4¾". Incl. step-by-step assembly diagrams, 32-page instruction book covering operation, computer language (binary system), programming, problems and 15 experiments.

Stock No. 70,683-H ..... **$5.00 Ppd.**

OPAQUE PROJECTOR

Projects illustrations up to 3" x 3½" and enlarges them to 35" x 50" if screen is 6½ ft. from projector; larger pictures if screen is further away. No film or negatives needed. Projects charts, diagrams, pictures, photos, lettering in full color or black-and-white. Operates on 115 volt, A.C. current. 6-ft. extension cord and plug included. Operates on 60 watt bulb, not included. Size 12" x 8" x 4½" wide. W. 1 lb., 2 oz. Plastic case.

Stock No. 70,199-H ..... **$7.95 Postpaid**

FASCINATING NEW KALEIDOSCOPE INSERT

Same set as above, but provides endless additional projects with ever-changing kaleidoscope patterns.

Stock No. 70,714-H ..... **$10.00 Ppd.**

'FISH' WITH A WAR SURPLUS MAGNET

Go Treasure Hunting On The Bottom

Great idea! Fascinating fun and sometimes tremendously profitable! Tie a line to our 5-lb. Magnet—drop it overboard in bay, river, lake or ocean. Troll it along the bottom—your "treasure" haul can be outboard motors, anchors, fishing tackle, all kinds of metal valuables. 5-lb. Magnet is war surplus—Alnico V Type—Gov't. Cost—$50. Lifts over 125 lbs. on land—much greater weights under water. Order now and try this new sport.

Stock No. 70,571-H. 5 lb. Magnet ..... **$12.50 Postpaid**

Stock No. 70,570-H. 3½ lb. Lifts 40 lbs. ..... **$ 8.75 Postpaid**

Giant 15 lb. Magnet Feat. Oct. POP. MECH
"3RD HAND FOR SHOP CHORES"

STOCK NO. 85,152-H . . . (lifts over 250 lbs) ..... **$33.60 F.O.B.**

For P.M.'s PROJECT-A-PLAN . . . $7 SLIDE PROJECTOR WITH KALEIDOSCOPE ATTACH.

Stock No. 70,676-H Optics Kit ..... **$4.00 ppd.**
Stock No. 70,677-H Kaleidoscope Kit ..... **$6.50 ppd.**

Order by Stock No.—Send Check or M.O.—Money-Back Guarantee

EDMUND SCIENTIFIC CO., Barrington, New Jersey

MAIL COUPON FOR FREE CATALOG "H"

Completely new 1965 Edition, 148 pages. Nearly 4000 Bargains.

EDMUND SCIENTIFIC CO., Barrington, N. J.
Please rush Free Giant Catalog "H".

Name.....

Address.....

City.....Zone.....State.....

LEARN
ELECTRONICS

FOUNDED 1899 NOT-FOR-PROFIT

COYNE ELECTRONICS INSTITUTE

Electronics Engineering Technology	—	Degree (2 Yrs.)
Electrical-Electronics Technician	—	Diploma (40 Wks.)
TV-Radio-Electronics Technician	—	Diploma (40 Wks.)
Combined Electronics Technician	—	Diploma (80 Wks.)
Practical Electrical Maintenance	—	Diploma (32 Wks.)
Practical Refrigeration Air Conditioning and Appliance Repair	—	Diploma (24 Wks.)
Specialized Industrial Electronics	—	Diploma (16 Wks.)
Introduction to Electricity-Electronics	—	Certificate (8 Wks.)
FCC First Class Radiotelephone	—	Certificate (100 Hrs.)

Special finance plans. Part time employment service while in school. Also Free graduate employment service.

SPECIALTY-ORIENTED STUDENT RESEARCH PROGRAM — PARTICIPATING RESEARCH SCHOOL — STATE UNIVERSITY OF IOWA

Use this coupon to get our FREE BOOK
"YOUR OPPORTUNITIES IN ELECTRONICS"
COYNE ELECTRONICS INSTITUTE, Dept. of Electronics 25-S
1501 W. Congress Parkway, Chicago, Illinois 60607

Name_____Age_____
Address_____Phone_____
City_____Zone_____State_____
Unlike most other schools, we do not employ salesmen

HELP WANTED—SPARE TIME

SENSATIONAL NEW LONGER-BURNING LIGHT BULB. Amazing Free Replacement Guarantee—never again buy light bulbs. No competition. Multi-million dollar market yours alone. Make small fortune even spare time. Incredibly quick sales. Free sales kit. MERLITE (Bulb Div.), 114 E. 32nd, Dept. C-15F, New York 16, N.Y.
In Canada: Mopa Co., Ltd., 371 Dowd St., Montreal 1, PQ.

Science Worldwide

(Continued from page 12)

that, spending a good hour poring over the lad's notebooks. As it turned out, he couldn't find the mistake either—but both had a rewarding hour of discussion.

The Milky Way has become a yardstick for measuring dim light. This famous feature of the night sky is made up of millions of stars and casts a very steady light. So the Bureau of Standards in Washington has devised a way for scientists all over the earth to check their light-measuring instruments by the Milky Way. This way, they all will know that their instruments are measuring on the same scale and that their results are truly comparable.

Blowing berries off the bushes instead of picking them is a method of crop gathering developed in Great Britain. The new harvesting device works off a tractor. It slides a pair of plastic baskets under the bush—one on each side—and blows. Compressed air from a nozzle plays over the bush and ripe berries drop into the baskets.

Do supersonic booms make nervous wrecks out of livestock? That's what the British Ministry of Aviation is trying to find out because a number of farmers have made claims against the Government, saying they've suffered economic damage because of noises from the sky.

So, scientists are busy bombarding herds of cows and flocks of chickens with booming noises and counting eggs and measuring milk. Early results show that the booms seem to have a temporary effect on egg and milk production. But soon, like city dwellers, the cows and chickens get used to the racket.

Two scientists—one from Purdue and one from Florida State University—have come up with a computer method of evaluating the water potential of an area and determining where to drill wells.

They provide the computer with thousands of statistics about an area—the water levels of a great number of wells at many different times, and the day to day rainfall—and the computer creates a map showing zones of unusual water accumulation. These zones are the best places to drill.

John F. Pearson
Science Editor

FOR THE FIRST TIME UNDER $300

A PROFESSIONAL MINIATURE INVESTIGATOR'S RECORDER

FITS IN PALM OF YOUR HAND OR IN YOUR POCKET. TRUE FIDELITY — FULLY TRANSISTORIZED, DESIGNED FOR LAW ENFORCEMENT OFFICERS WHO WISH TO RECORD SECRETLY.

WARNING
Not for sale in states where this may be illegal.

Only $39.95 *Deluxe Quality Model*

DOES TWICE AS MUCH AT HALF THE COST!

A Professional Miniature Recording Device, Automatically stores your ideas, reports, memos . . . Repeats them on demand. Talking note pad eliminates writing. A "Must" for the man on the go. Sensational value compares with recorders selling at much higher prices. All functional controls at your fingertips—instant recording stop, reverse, playback. No need to remove recorder from case. Sturdily crafted—brilliantly engineered. Unconditionally guaranteed for 90 days against defects in material or workmanship.

- *45 Minute Recording*
- *Fully transistorized*
- *Actual size 2" x 3¼" x 5¾"*
- *Unbreakable handsome metal case (black and silver)*
- *Weight 1 lb. (approx.)*
- *Easy push button controls at top, instant playback*
- *Unconditionally guaranteed.*

COMPLETE with conference microphone, remote control switch, private ear phone, reels, magnetic tape, batteries, leather carrying case and strap, microphone case.

ALSO INCLUDES SECRET TIE-CLIP MICROPHONE for on the spot recording at no charge. Provides sensitive pickup range to 35 feet or more.

10 DAY TRIAL—ORDER TODAY

STANDARD AMERICAN SUPPLIERS, INC.
Dept. 1-PM, One Park Ave., New York, N. Y. 10016
Gentlemen:

Please ship ..... Investigator Recorders
@ $39.95 complete with batteries & magnetic reels of tape on 10 day trial. If not delighted I may return (in good condition of course), for full refund.
☐ Telephone adapter—attaches instantly to any phone and clearly records conversations $4.95
☐ 3 reels of mylar tape—3 hours recording time $2.50

NAME .....

ADDRESS .....

CITY ..... STATE .....
Add $1.50 for postage & handling per Investigator Recorder

Land & Sea

BEAM LIGHTS
80,000 Candlepower

☐ $9.95 each for 2
☐ $10.95 for 1

Made to pierce murky depths and withstand pressures of underwater operation. On land its beam leaps out for twenty miles, 80,000 candlepower illuminates objects clearly a mile away. Pierces smoke-filled areas. Stands alone on special foot. Floats in water. Unbreakable lens. You can jump on this flashlight. Used by police in squad cars, skin divers, boatsmen, hunters, fishermen, shippers, watchmen, firemen. Send check or money order.
TREMENDOUS PIERCING BEAM ON LAND—CUTS THROUGH FOG & SMOKE

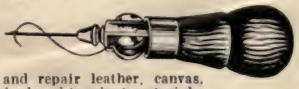
ANEROID BLOOD PRESSURE MACHINE
(Sphygmomagnometer) With Velcro Cuff

$16.50 Plus 50c PP & Hdlg.

Highest quality, precision-made, professional model. Used by doctors, hospitals, schools—and individuals. You can have them with either Velcro or Hook Cuff (please specify) and each instrument is packed in a genuine leather case. A terrific bargain at only **$16.50, plus 50c pp. & hdlg. SPECIAL: Two for $30 ppd.**
For Ford Type Stethoscope add $2.95.
Brand New—Fully Guaranteed

SEWS AND REPAIRS LEATHER, CANVAS

STITCHES LIKE A MACHINE



No experience needed. Sew and repair leather, canvas, convertible tops, upholstery, vinyl and toughest materials. Just push in, pull out. Fast, easy. Automatically you have a Lock-Stitch just like an industrial sewing machine. Material repaired is reinforced extra strong. Trouble free, heavy duty tool. Half a million satisfied users. **FREE 30 FT. Heavy Cord — Special Needles** You also receive utility wrench, extra waxed thread and needles that fit right into handle. Easy pictured directions. Pays for itself with first repair job.

Send **$1.97** plus 25¢ postage and handling.

Fastens metal and wood instantly to concrete, masonry, brick . . . even STEEL!

No drilling—No plugging — No Explosives!

Now in 3 seconds you can drive a nail or bolt up to 3" length and more through wood and metal into tough concrete, cinder block or steel. Holds 100 lbs. and more. No dangerous flying cinders, shields, plugs or toggle bolts. Concentrates tremendous impact power in the special sure-grip fastener head, drives straight down barrel for fast guaranteed secure attachment.
Ideal for fastening furring strips, shelves, 2x4's, concrete, boxes and conduit, drape brackets, heating units, mail boxes, plumbing, fire extinguishers, signs, patio fences, etc.
Complete Professional Self-Fastening Kit including 12 most popular size fasteners . . . . . **$3.95** Plus 55¢ pp & Handling
(Extra Fasteners—1 Set 98c) (3 Sets—$2.84)

NEW ENGINE BLANKET
For instant Start in Freezing Weather

Heavy insulated orlon-filled blanket retains engine heat up to 48 hours. Keeps car approximately 36 degrees above outside temperature. Insures instant starting even in below freezing temperatures. Just cover engine block and forget it. No plug in or electricity. Water-proof. Acid resistant. Flame proof. 38"x40" fits all size engine blocks. Only **$5.98** plus 50c pp & hdlg. Order now for immediate delivery.

$5.98 plus 50¢ pp & hdlg.

FIX YOUR OWN DENTURES
Make Broken or Loose False Plates like New

Dent-A-Fix Repairs Broken plates and teeth—at home in seconds. Also tightens loose fitting plates quick. Permanent comfort with professional material. No embarrassment. No waiting. Easy instructions.

Send only **$1.98** cash, check or money order, plus 25¢ pp & hdlg.

STANDARD AMERICAN Suppliers, Inc.
Dept. 2-PM ONE PARK AVENUE • NEW YORK N.Y.10016

ACCOUNTING
- Accounting for Business Programmers
- Cost Accounting
- C.P.A. Review
- Estate & Trust Accounting
- Executive Accounting
- Federal Tax
- General Accounting
- Industrial Accounting
- Legal Accounting
- Office Accounting
- Personal Income Tax & Social Security
- Practical Accounting
- Public Accounting
- Small Business Accounting
- Starting & Managing a Small Bookkeeping Service

ARCHITECTURE AND BUILDING
- Architectural Drawing & Designing
- Architecture
- Building Contractor
- Building Estimator
- Building Inspector
- Building Maintenance
- Carpenter-Builder
- Carpentry & Millwork
- House Planning & Interior Design
- Mason
- Painting Contractor
- Reading Arch. Blueprints
- Review in Arch. Design & Practice
- Review of Mech. Systems in Buildings

ART
- Amateur Artist
- Commercial Art
- Commercial Cartooning
- Illustrating
- Interior Decorating
- Oil Painting for Pleasure
- Show Card & Sign Production
- Show Card Writing
- Sign Painting & Designing
- Sketching & Painting

AUTOMOTIVE
- Automatic Transmission Specialist
- Automobile Body Rebuilding & Refinishing
- Automobile Electrical Technician
- Automobile Engine Tune-Up
- Automobile Technician
- Automotive Mechanic
- Diesel-Gas Motor Vehicle Engines

BUSINESS
- Advertising
- Basic Inventory Control
- Business Administration
- Business Management & Marketing
- Business Management & Production
- COBOL Programming
- Condensed Business Practice
- Industrial Psychology
- Managing a Small Store
- Marketing
- Modern Executive Management
- Office Management
- Programming for Digital Computers
- Programming the IBM 1401 Computer
- Purchasing Agent
- Retail Business Management
- Statistics and Finance
- Systems and Procedures Analysis

CHEMICAL
- Analytical Chemistry
- Chemical Engineering
- Chemical Engineering Unit Operations
- Chemical Laboratory Tech.
- Chemical Process Control Technician
- Chemical Process Operator
- Elements of Nuclear Energy
- General Chemistry
- Instrumental Laboratory Analysis

CIVIL ENGINEERING
- Civil Engineering
- Construction Engineering
- Highway Engineering
- Principles of Surveying
- Reading Highway Blueprints
- Reading Structural Blueprints
- Sanitary Engineering
- Sewage Plant Operator
- Structural Engineering
- Surveying and Mapping
- Water Works Operator

DRAFTING
- Aircraft Drafting
- Architectural Drafting
- Electrical Drafting
- Electrical Engineering Drafting
- Electronic Drafting
- Introductory Mechanical Drafting
- Mechanical Drafting
- Pressure-Vessel and Tank Print Reading
- Sheet Metal Layout for Air Conditioning
- Structural Drafting

ELECTRICAL
- Electric Motor Repairman
- Electrical Appliance Servicing
- Electrical Contractor
- Electrical Engineering (Power option or Electronic option)
- Electrical Engineering Tech.
- Electrical Instrument Tech.
- Industrial Electrical Tech.
- Industrial Telemetering
- Power Line Design and Construction
- Power Plant Operator (Hydro or Steam Option)
- Practical Electrician
- Practical Lineman
- Reading Electrical Blueprints

CAST YOUR BALLOT FOR A SUCCESSFUL FUTURE!

253 I.C.S.

Special in-plant training programs for industry

Low rates for members of the United States Armed Forces

New! Special Package for Women

I.C.S. is the oldest, largest school of its kind. Over 200 courses for men and women. High school, business, secretarial, interior decorating, engineering. One for **you.** Direct, job-related. Bedrock facts and theory plus practical application. You learn from experts. Diploma to graduates.

Clip and mail the coupon **now.** You'll receive, absolutely FREE, 3 valuable booklets that have helped thousands. But don't delay. Cast **your** "ballot" today!

ENGINEERING (Professional)
Chemical
Civil
Electrical
Industrial Management for Engineers
Mechanical

ENGLISH AND WRITING
Better Business Writing
Introductory Technical Writing
Modern Letter Writing
Practical English
Short Story Writing

HIGH SCHOOL
High School Business
High School College Prep. (Arts)
High School College Prep. (Engineering & Science)
High School General
High School Mathematics
High School Secretarial
High School Vocational

LANGUAGES
(Edited by Berlitz)
French
German
Italian
Spanish

LEADERSHIP
Basic Supervision
Industrial Foremanship
Industrial Supervision
Personality Development
Personnel-Labor Relations
Supervision

MATHEMATICS
Advanced Mathematics
Mathematics and Mechanics for Engineering
Mathematics & Physics for Technicians
Mathematics and Physics for Engineering
Modern Elementary Statistics

MECHANICAL
Industrial Engineering
Industrial Instrumentation
Machine Design
Mechanical Engineering
Quality Control
Safety Engineering Tech'l'gy
Tool Design
Value Analysis

PETROLEUM
Natural Gas Production & Transmission
Oil Field Technology
Petroleum Production
Petroleum Production Engineering
Petroleum Refinery Operator
Pipeline Engineering

PLASTICS
Plastics Technician

PLUMBING, HEATING, AIR CONDITIONING
Air Conditioning
Air Conditioning Maintenance
Domestic Heating with Oil & Gas
Domestic Refrigeration
Gas Fitting
Heating
Heating & Air Conditioning with Drawing
Plumbing
Plumbing & Heating
Plumbing & Heating Contractor
Plumbing & Heating Estimator
Practical Plumbing
Refrigeration
Refrigeration & Air Conditioning
Steam Fitting

PULP AND PAPER
Paper Machine Operator
Paper Making
Pulp Making
Pulp & Paper Engineering
Pulp & Paper Making

SALESMANSHIP
Creative Salesmanship
Real Estate Salesmanship
Sales Management
Salesmanship
Salesmanship & Sales Management

SECRETARIAL
Clerk-Typist
Commercial
Legal Secretary
Medical Secretary
Professional Secretary
Shorthand
Stenographic
Typewriting

SHOP PRACTICE
Drill Operator
Foundry Practice
Industrial Metallurgy
Lathe Operator
Machine Shop Inspection
Machine Shop Practice
Machine Shop Practice & Toolmaking
Metallurgical Engineering Technology
Milling Machine Operator
Patternmaking
Practical Millwrighting
Reading Shop Prints
Rigging
Tool Engineering Tech'l'gy
Tool Grinder
Toolmaking
Turret Lathe Operator
Welding Engineering Technology
Welding Processes

STEAM AND DIESEL POWER
Boiler Inspector
Industrial Building Engineer
Power Plant Engineering
Stationary Diesel Engines
Stationary Fireman
Stationary Steam Engineering

TEXTILES
Carding
Carding and Spinning
Cotton Manufacturing
Dyeing & Finishing
Loom Fixing
Spinning
Textile Designing
Textile Mill Supervisor
Textile Technology
Warping and Weaving
Wool Manufacturing

TRAFFIC
Motor Traffic Management
Railway Rate Clerk
Traffic Management

TV-RADIO-ELECTRONICS
Communications Techn'l'gy
Electronic Fundamentals
Electronic Fundamentals (Programmed)
Electronic Fundamentals with Electronic Equipment Training
Electronic Instrumentation & Servo Fundamentals
Electronic Principles for Automation
Electronics and Applied Calculus
Electronics Technician
First Class Radiotelephone License
Fundamentals of Electronic Computers
General Electronics
General Electronics with Electronic Equip. Trng.
Hi-Fi Stereo and Sound Systems Servicing
Industrial Electronics
Industrial Electronics Engineering
Industrial Electronics Engineering Technician
Practical Radio-TV Eng'r'g
Practical Telephony
Principles of Radio-Electronic Telemetry
Principles of Semiconductor-Transistor Circuits
Radio Servicing with Radio Equipment Training
Radio & TV Servicing
Radio & TV Servicing with Radio Equip. Trng.
Second Class Radiotelephone License
Sound Systems Specialist
Telephony, Electronics and Radio Communications
TV Receiver Servicing
TV Technician

COURSES

Clip coupon—and take your first big step to real success! I.C.S., Scranton, Penna. 18515

In Hawaii: P.O. Box 418, Honolulu
In Canada: I.C.S. Canadian, Ltd., Montreal

FREE! THE I.C.S. SUCCESS KIT!
Three valuable booklets sent to you free when you mark and mail the I.C.S. coupon. No obligation.

1. "How to Succeed"—A new, exciting booklet that lets you evaluate yourself and your future in an entirely different way!

2. Complete catalog outlining job opportunities and outlook in your field of interest.

3. Sample lesson to demonstrate the success-proved I.C.S. method of spare-time study.

Accredited Member, National Home Study Council

INTERNATIONAL CORRESPONDENCE SCHOOLS I C S

Box 457, Scranton, Penna. 18515
Without cost or obligation, send me "HOW to SUCCEED," the opportunity booklet about the field I have indicated below, and a sample lesson.

Course in which I'm interested:_____
(Select from listing above)

Name_____ Age____
(Indicate Mr., Mrs., or Miss)

Address_____

City_____ State_____ Zip code_____

Occupation_____ Working hours____a.m. to____p.m.

Employed by _____

Save Money on WOOD

POWER TOOLS • HARDWARE • KITS
WORKSHOP SUPPLIES • EQUIPMENT
NEW LOW PRICES!

Hardwoods, Veneers, Plywoods, Mouldings, Mosaic Tile, Tools, LampParts, UpholsterySupplies

Your complete wood and workshop buying guide—new 140 page edition now ready. Many pages in full color! Startling new savings on everything you need! Craftsman is your best and most complete source of the finest quality kiln-dried domestic and imported hardwoods. Beautiful wood inlays, bandings, matched plywoods, carved ornaments, modern & traditional furniture legs.

NEW! **140 PAGE CATALOG** ***SEND FOR IT TODAY***

Discounts on Stanley Power Tools

Craftsman offers startling savings on top name power tools, hard to find cabinet hardware, lamp and upholstery materials. More than 1,500 items. Packed with new patterns, projects. Enclose 25c to help pay mailing and handling costs.

CRAFTSMAN WOOD SERVICE CO.
2729 S. Mary St., Dept. A-2, Chicago 8, Ill.

CRAFTSMAN WOOD SERVICE CO., Dept. A-2
2729 South Mary St., Chicago 8, Illinois
Rush giant new Craftsman WOOD Catalog. I enclose 25c to help cover mailing cost

Name _____

Address _____

City _____ Zone ____ State _____

SEALS TUBS

DAP® KWIK-SEAL® Tub & Tile CAULK

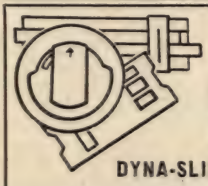
Gives rubber-like, watertight seals around tubs, showers, lavatories, sinks. Caulks around interior window and door frames; fills holes. Easy to apply. No unpleasant odor. Takes paint. Money-back guarantee. Sold at leading hardware, building supply, paint and specialty stores.

DAP® DAP INC., Dayton 31, Ohio
SUBSIDIARY OF *Plough, Inc.*

BUILD CUSTOM CASES AT HOME FOR PROFIT—GET ORDERS BY MAIL

Here is a spare time or full time Home Business so extensive that you will almost catch your breath when you see it for the first time. Learn how you can make Custom Cases in your home to tap a waiting, rich market—to make yourself financially independent for life. We supply materials, instructions, everything. No canvassing: No house to house selling: No salesmanship needed: Send for the full story of this amazing opportunity. Everything Sent FREE.

CUSTOM CASE SUPPLY CO.
Dept. C22 805 Sunset Blvd., Los Angeles 12, Calif.



SPECIAL
SLIDE RULES

for every business, trade or interest. FREE catalog lists over 200 different slide rule, selectors & calculating aids.

DYNA-SLIDE CO. 600 S. Michigan Chicago, Ill. 60605

RETIRE with RICHES

ENJOY BIG INCOME WITHOUT WORKING!
Chain sponsorship PYRAMIDS you into fantastic earnings. Retire, and profits can continue. Write for FREE Instant Money KIT now. Exclusive "sells itself" money-maker sweeping nation!

FREE INSTANT MONEY KIT
G & A INDUSTRIES, Inc. Dept. PM-35
P.O. Box 67, Midwood Station, Brooklyn 30, N.Y.

BUY 1964 CARS DIRECT - BELOW WHOLESALE

only $899

'64 STUDEBAKER LARK. . . . $699
Plus 4 New Firestone Tires
'63 CHEVY BISCAYNE. $699
With Power Steering at No Extra Cost.
'63 FORD CUSTOM 300. $599
These were New York taxis. No taxi signs or markings.
No different than regular passenger cars. Guar. in perfect running condition. Call, Wire, Write Larry Shandel. For FREE Illustrated Catalog & Photos.

'64 FORD CUSTOM
No Sales Tax. Clear Titles On All Cars.
4 door, 6 cyl., automatics
phone: 201-HE 5-8400-1
N.Y.C. 212 - CO 7-4440

UNIVERSAL AUTO WHOLESALERS INC. - Est. 1959
Dept. PM-2: 990 Newark Ave., on Route 1&9 Jersey City, N.J. 07306

A BUSINESS OF YOUR OWN
REPAIR HYDRAULIC JACKS

Earn while you learn at home. Trained and qualified mechanics needed NOW to service inoperative hydraulic jacks. BIG opportunity for ambitious men. We show you HOW — in your basement or garage, spare time cash income in an expanding industry. Don't wait, ACT NOW! Get the facts.

Write for folder PM 2 and free bonus offer

HYDRAULIC JACK REPAIR MANUAL CO.
P. O. BOX 50 • BLOOMFIELD, N. J.

BOAT KIT CATALOG FREE!
Fiberglass or Plywood

Low Down Payment
EASY TERMS

Save $1000 to $2500 on 18', 20', 22' Luger Luxury Cruisers . . . save to $4000 on 22' Houseboat and 26' and 30' Cruisers . . . to $500 on speedy 14' or 16' Molded Fiberglass Runabouts! OVER 50 MODELS! Easily assembled. Every part and every section pre-cut, pre-assembled or precision molded. Just put together! 3 Years to Pay! MONEY BACK GUARANTEE! Rush coupon for 48 page catalog—FREE!

Rush Coupon Free Color Catalog

LUGER BOAT KITS, Dept. B-25
9200 Access Road, Minneapolis, Minn. 55431
Rush Full Color Boat Kit Catalog—FREE
NAME _____
ADDRESS _____
CITY _____ ZONE ____ STATE _____

- For Action, Security, Big Pay -

WE CHALLENGE YOU TO TOP THIS JOB!

Earn To $15 An Hour ★ Work Part-Time Or Full-Time ★ Car Furnished — Expenses Paid ★ No Selling — No Previous Experience Needed ★ Only Average Education Required

NO OTHER CAREER OFFERS YOU A BRIGHTER FUTURE

Consider this fact. In the short time it takes you to read this page 1,100 accidents will take place. Over 440,000 will occur before this day ends. *These accidents must be investigated.* The law demands it. Yet in 4 out of 5 cities, towns and rural communities, no one has been trained for this vital work.

KEEP PRESENT JOB UNTIL READY TO SWITCH

Step into this fast-moving Accident Investigation field. *Already* hundreds of men we have trained are making big money. Joe Miller earned $14,768 his first year. A. J. Allen earned over $2,000 in ten weeks. Robert Meier says "I'm now earning $7.50 to $15.00 an hour in my own business . . . Universal's course is wonderful."

FREE EMPLOYMENT HELP GIVEN

We CAN and WILL show you how to rapidly build your own full-time or part-time business. Or if you wish a big-pay job as Company Claims Investigator, our Placement Service will give you *real* assistance. Hundreds of firms needing men call upon Universal. *We place far more men in this booming field than any other individual, company or school.*

WE FINANCE YOU

Write today for complete information. Costs are less than you'd imagine. And even on these low costs you need pay only a portion — less than half — in order to complete your training. We finance the rest for you. You may pay out of actual earnings. And you can keep present job while learning. Send now for free book. No salesman will call. You are not committed in any way.

EARN WHILE YOU LEARN

Let us show you how easy it is to get into this exciting new career in just a matter of weeks. You need NO prior experience or higher education. There's NO investment in expensive equipment. You do NO selling. Furthermore, this fast-growing Accident Investigation field has no seasonal layoffs . . . no time out for strikes . . . no oversupply of men . . . no worry about automation. We ask you to compare these terrific advantages with the job you now have! Cash in on this big demand for trained men NOW. *Write today!*

Mail Now for FREE BOOK

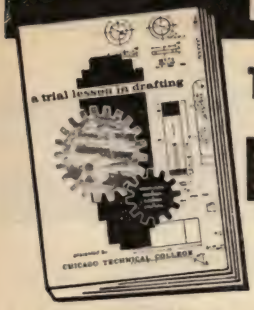
M. O. Wilson, Dept. PM-2
Universal Schools,
6801 Hillcrest, Dallas 5, Texas
Please rush me your FREE BOOK on Big Money In The Booming Accident Investigation Field. I will not be under the slightest obligation — and no salesman will call upon me.

Name .....

Address .....

City ..... Zone ..... State .....

FREE!



Trial lesson in DRAFTING & DESIGN

LEARN AT HOME IN SPARE TIME

Check the want ads in any newspaper—SEE the big-pay opportunities open to you as a draftsman. What's more, you can learn this well-paid, prestige profession at home—quickly, easily! No special talent needed! Get complete, step-by-step Chicago Tech lessons in the mail, spend a few pleasant hours studying each week. In a short time you'll be a well-trained draftsman, ready to take your pick of many good jobs. Act now!

FREE INFORMATION—MAIL COUPON TODAY!

Get FREE TRIAL LESSON plus information about C.T.C. practical training. Learn what successful Chicago Tech graduates say about high pay and opportunities in drafting. No charge, or obligation.

Est. 1904 Accredited National Home Study Council

CHICAGO TECHNICAL COLLEGE

B-203 Tech Bldg., 2000 So. Michigan Ave. Chicago 16, Illinois

Mail me FREE Lesson with information about big opportunities in DRAFTING.

Name..... Age.....

Address .....

City..... Zone..... State.....

HOT SHOT

Amazing New **BENJAMIN**

30 30 CO_2 GAS

BB CARBINE REPEATER

— Packs a PUNCH that's so POWERFUL it will Drive STEEL BBs thru Both Sides of a 5 Gal. Steel Pail at close range! (26 ga. .018")

You're in for a thrill you'll never forget the first time you shoot HOT SHOT! The Hardest Shooting CO_2 Gun on the market—New Model 30 30 embodies features that also assure Flawless Performance: Permanent Alnico V Cast Magnet Shot Holder . . . a Positive, Jam-proof method of loading Ammo in firing position; Convenient, Positive Hammer Safety; 30-BB Mag.; 30 Shots per cartridge; Quality Built. Lightweight—Accurate —Field Tested — Lowest Shooting Costs —use Indoors/Outdoors.

$16.95 Ask Dealer for Demonstration.

BENJAMIN AIR RIFLE COMPANY

896 Marion St., St. Louis, Mo. 63104

FREE Catalog Benjamin Single Shot and Repeaters — Cal. BB or 177 or 22. Also Special Hunting Knife Offer. Write today!

You Can DEPEND on BENJAMIN

Sidelights from the SERVICES

By William R. Kreh

A whale killer aided missile research recently. The Army Missile Command is developing a high-acceleration experimental booster rocket. During its development, engineers wanted to attach an electrical cable to the rocket during early test firings for reporting data during the first moments of flight.

But first they needed to know what kind of cable would work, how it must be attached and how it would react under extreme acceleration. So the contractor for the project—Boeing Aircraft—borrowed a harpoon gun from the U.S. Fish and Wildlife Service.

Machinists fashioned a blunt-nosed harpoonlike projectile to which cables being tested could be attached. Engineers used the gun for three weeks, testing various types of cables and making high-speed movies of the firings.

The dust cyclone caused by whirring rotor blades as a helicopter hovers over unpaved terrain may be eliminated with a new landing pad being tested by the Marine Corps.

Working much like the tarp used to protect a baseball diamond during rain, the 150-ft.-square pad is nylon fabric laminated on both sides with vinyl. It weighs about 2800 pounds.

The accordion-folded sheet is unfolded from a fork-lift and spread out by a squad of Marines. A road grader rapidly excavates ditches on all sides of the sheet and then back-fills to anchor the pad in place.

A "slush hydrogen" plant is being built at Wright-Patterson Air Force Base, Ohio. Hydrogen forms a snowlike solid at 436 degrees below zero. In this state, it can be stored in less space than it can either as a gas or liquid, is less expensive and can be heated back to liquid form for use in space vehicles when needed.

Astronauts returning from the first long mission in space who faint at their reception when they get back, probably won't do it from the excitement of the moment. The Air Force's School of Aerospace Medicine has been experimenting with volunteers who spent four weeks in bed to simulate the inactivity of space flight. They all tended to faint when they got up.

$40,000 First Year

"In our first calendar year we did a gross of $40,000. Without constant help from the Duraclean home office such growth never would have been possible."

M. L. Illinois

Security-Prestige- and Profits

"National Advertising and Duraclean prestige are very important. This year I will double last year's gross. For the first time in 20 years I've got security—without fear of losing my factory job. I gross about $8.50 an hour on the job."

H. P. Ohio

$2,880 in One Month

"I took in $2,880 in April. I worked from my home. My wife handles all telephone calls. We both enjoy our new found independence and the compliments we get from satisfied customers."

J. F. A. Texas

$360 Job Finished in one day

"I did the Sorority House in one day for $360. This business is in its infancy."

H. L. B. Texas

$116 for 6 Hours Work

"I have done hotels, studios, restaurants and churches. That is where the big money is. Example: One Saturday, $210 in 11 hours. Monday, $116 in 6 hours. I have also contracted to clean 80,000 square feet of carpet for a store for $4,000."

G. F. Wisconsin

FREE BOOK tells how these people—and hundreds of others—got started in this Big Money business. Send for your copy now.

Let me give *you* the same start I gave these men!

In one way, the big earnings reported here might be called exceptional. In another way, there is nothing exceptional about them. That's because any man who will follow instructions and is willing to work at his own Duraclean business should be able to do as well under similar conditions.

Each of the men quoted here had talents and abilities different from those of all the rest. *But each had one thing in common*—a desire to win personal independence in a business of his own. And each man took five identical steps to reach his goal.

1. Each one read an announcement such as you are reading now. 2. He wrote for complete information. 3. He read the literature we sent him. 4. He gained new confidence in himself and the belief that he could succeed with Duraclean. 5. He accepted our offer to help him get started. Later, he wrote to tell us about his success.

In each case, remember, *the first step was to write to Duraclean for information.* If you would like to own a business of your own, why don't you do as these men did—*right now.*

When I hear from you, I will send you facts about the Duraclean Franchise that will open your eyes. You will see why a Franchise business such as ours makes success for the individual the rule rather than the exception.

The Duraclean home service business has been tried and tested. The market for Duraclean Service is tremendous—and growing. The methods that lead to success have been clearly charted. When an ambitious man follows these methods, success is the logical result.

Some Franchise businesses require investments as high as $50,000. With ours, you can get started for a few hundred dollars and we finance the balance. Monthly payments are so small that the profits on less than one day's service can cover your payment for the entire month. Even with this small investment and operating as a one man business, your potential is $250.00 a week net profit. With two men working for you 35 hours a week, you should gross a profit of $420.00. Allowing 20% for advertising and incidentals, the net would amount to $336.00.

The most important part of Duraclean home service is cleaning rugs, carpets and upholstered furniture by a revolutionary modern process known as the "Absorption Method." You do the work right in the customer's premises. No harsh scrubbing with motor-driven brushes. No soaking. Instead, an aerated foam loosens the dirt and holds it in suspension until removed. A test conducted by an impartial laboratory showed that the modern Absorption Method removed twice as much dirt as was removed by old fashioned machine scrubbing.

If you are tired of working for others or of jumping from one proposition to another—if you have a real yearning for independence in a business of your own—then send for "The Duraclean Route to Success." There is no obligation—no charge. No salesmen will call to high pressure you. Send for the book now. Read it. Then if you want to take the next step toward independence, you can write to me and let me give *you* the same help I've given so many other successful men.

Grant Mauk
President

DURACLEAN COMPANY
5-162 Duraclean Building, Deerfield, Ill. 60015

GRANT MAUK, *President*
5-162 Duraclean Bldg., Deerfield, Ill. 60015

Dear Mr. Mauk:

Please mail a copy of your Free Book that tells how I can get a Duraclean Franchise started in spare time without giving up my present income. No charge. No obligation. And no salesman is to call on me.

Name_____

Address_____

City_____ State_____ Zip Code_____

Pontiac Motor Division • General Motors Corporation

A flying machine for people who can't stand heights.

You can get a set of five big, full-color action shots of the GTO and 2 + 2—suitable for framing—see details below.

The object in the foreground is a Pontiac 2+2. It's what you might call a sudden automobile. Meaning that if it had started accelerating when this sentence began, you would now be feeling enormous pressure on your abdomen. Bucket seats and full carpeting are standard. So are a Hurst floor shifter, 3-speed fully synchronized transmission, heavy-duty springs and shocks, and lots more. The moving force is a 421-cubic inch V-8 with 338 hp. Still more pressure can be applied with the optional 356 and 376 hp versions of the same powerplant. The line forms outside Pontiac dealers for flying tiger rides.

Pontiac will send you a set of five huge 26" x 11½" full-color reproductions of the famous Wide-Track Tigers in action just like the one above—along with a complete set of specs and tune-up tips—and they're suitable for framing. Send 25¢ to cover handling and mailing to Wide-Track Tigers, P. O. Box 888H, 196 Wide-Track Blvd., Pontiac, Michigan. (No stamps please.)

Quick Wide-Track Tigers—Pontiac 2+2 and GTO

94.6% OF BAILEY GRADUATES ARE EMPLOYED AT TOP PAY IN THE FIELDS WHICH THEY WERE TRAINED!

DIESEL-AUTO MECHANICS DESPERATELY NEEDED!

We have a far greater demand for our students than we can fill!

We can show you an actual waiting list of leading companies throughout the world who have tried Bailey graduates — found them outstanding, and are coming back for more!

Bailey Graduates are Successful . . . RECEIVE BIG PAY — HAVE SECURE FUTURE!

The Famous Bailey Course prepares you for BOTH Diesel and Gasoline Mechanics.

This is a **must**-due to the advent of using Diesel principles, such as 'Fuel Injection' on passenger cars . . . use of gasoline engines for starting Diesel engines, etc. You learn all this at Bailey in the amount of time ordinarily required to learn just one of these subjects, **ALL FOR THE PRICE OF ONE.**

Don't be satisfied with a 'futureless', one-type job — learn how you can make **big money** now!

Write today for Free Booklet that takes you on a step-by-step camera tour through our spacious, modern shops — See Bailey students in action as they Learn-by-doing with the Famous Bailey Method of training!

We provide you with housing and part time jobs while in school, plus nation-wide placement service for graduates.

BAILEY Technical SCHOOLS

1634 S. GRAND ST. LOUIS 4, MO.

MAIL TODAY!

Please mail immediately this free booklet without obligation.

FREE BOOKLET

Name.....

Address.....

City..... State.....

Telephone..... Age.....

SEND FOR THIS FREE!

Make money. Know how to break and train horses or ponies. *Write today for this book FREE*, together with special offer of a course in Animal Breeding. If you are interested in Gaiting and Riding the saddle horse, check here ( ). *Do it today—now.*

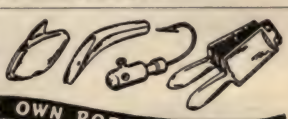
BEERY SCHOOL OF HORSEMANSHIP
Dept. 1102-D Pleasant Hill, Ohio

FLORIDA

CAMPSITES — deep in the heart of the great (440,000 acre) Ocala National Forest. Electricity. Best fishing, hunting. Warranty deed. **FREE maps and photos.**

Howard Vernor, DeLand, Florida

FREE CATALOG



MAKE YOUR OWN RODS AND LURES

Send for FREE Wholesale Catalog. The most complete and fully illustrated catalog of reels, rods, beads, spinners, jigs, lure bodies and parts, sinker molds, feathers, tools, hooks rod blanks, rod parts, swivels, wire, etc.

FINNYSPORTS
2065X SPORTS BUILDING TOLEDO, OHIO 43614

ALL FAMOUS BRANDS!

TIRES! FARM TRUCK AUTO

AT LESS THAN WHOLESALE

SAVINGS NEVER LESS THAN 50% up to 70% OFF REG. PRICE!

HEADQUARTERS for ALL SPORT CAR TIRE SIZES

FREE • SEND FOR YOUR FREE CATALOG • FREE!

RELIABLE TIRE DIST., 1111 Chestnut St., Camden, N. J.

Renew it with COLORCRETE

YOU CAN MAKE GOOD MONEY re-surfacing stucco, concrete, other masonry with Colorcrete. Easy to apply with spray-gun, becomes a permanent part of the masonry. Wide choice of colors. Write for free Colorcrete Opportunity Book.

W. E. DUNN MFG., CO., 570 Ottawa Ave., Holland, Mich.

Direct from England!

115 DIFFERENT BRITISH COLONIALS 24¢

Famous "Export Parcel" includes scarce old Classics, modern Pictorials, Regionals, Electronic issues! You get: Great Britain 1864 QUEEN VICTORIA; W. Australia 61 yr. old "SWAN"; 58 yr. old QUEENSLAND; unusual regionals for ULSTER, SCOTLAND; GHANA INDEPENDENCE; First 2 Electronic Stamps — with graphite on back; mint Queen & Sultan Issues from scarce colonies — KEDAH, GILBERTS, NAURU, TRISTAN, ASCENSION, MALACCA. Many others. Total 115 different. Regularly $1.68 — bargain export price 24¢ to introduce overseas approvals.

IMPORT DIRECT — SAVE 20-60%. Buy direct — where dealers buy. Exciting offers, low prices, yours from London the easy 14 day approval way. Satisfaction Guaranteed.

SEND 24¢ IN UNUSED U.S. STAMPS (NO COINS). Ask for Lot ZN-5

BROADWAY APPROVALS LTD. 50 Denmark Hill, London S.E. 5, England

© VOLKSWAGEN OF AMERICA, INC.

If you can sell her on this, you can sell her on anything.

"Me? In *that*?"

When you take your wife to see the Volkswagen Station Wagon don't be surprised if you have to drag her.

"But it looks silly."

That's your first problem: you have to explain the flat face and square shape.

The front is flat because the engine is in the back. This eliminates a long hood and makes our wagon almost as easy to park as our sedan.

(There's only 9 inches difference.)

And the square shape holds almost twice as much as an everyday station wagon.

170 cubic feet.

Once you coax her behind the wheel, be ready for something like this:

"But it's like sitting in a fishbowl."

She's right, it is. There are 21 windows.

And if she handles the family checkbook, you might show her a few numbers:

24 miles on a gallon of regular gasoline. 35,000 miles on tires. 4 pints of oil, not 4 quarts.

If you can sell your wife on the Volkswagen Station Wagon, consider yourself a star salesman.

We certainly will.

If you ever have to replace a GM part like this...

make sure they give you a GM part just like it.

Chances are, your GM car will never need another front internal gear for its transmission. But if it does, better take it where you know they use genuine General Motors replacement parts.

After all, it's genuine General Motors performance you want. So keep your GM car genuine . . . ask for genuine GM parts. You can find genuine GM and United Delco replacement parts just about anywhere. Wherever you take your car or truck for service, take it where they use genuine General Motors parts. They come in bright, modern packages like the ones show here.

GENUINE GENERAL MOTORS PARTS

GM CHEVROLET · PONTIAC · OLDSMOBILE · BUICK · CADILLAC · GMC TRUCKS United Delco

Need More Money? Want to Be Your Own Boss?

START SAW SHARPENING BUSINESS

Of Your Own – in Your Sparetime

Turn your spare hours in the evening or weekends into extra dollars, this proven practical way—start your own money-making sharpening business—No selling or canvassing—No experience required. You can do it automatically with the Foley Saw Filer or Lawn Mower Sharpener.

Beginners Earn $3 to $6 an Hour

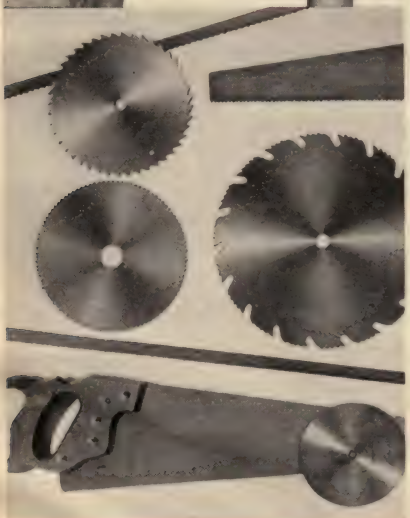
People, just like yourself, all over the United States are making extra cash—$20 to $30 a week—right now in their spare time. "My sparetime saw filing business has made me $952 these first ten months," says R. T. Chapman. Many start part-time, find it so profitable that they build year-round service business. You can, too, simply by following easy Foley plan.

Town of 150 Supports Profitable Business

Here's the story from Dick and Jo Ann Koester after being in business less than a year. "We have acquired another Foley Saw Filer and for the past two months we have been in full-time operation. As we live in a small town of 150 population in farm area we use our truck to pick up saws in five nearby towns. With a family to support and plans for building to our house we had to pick up a business fast and already sharpen an average of 15-20 saws a day. Business for the future looks even better as good machine filing is our best advertising."

CASH for Sharpening Mowers

Every neighbor with a lawn needs his lawn mower sharpened at least once a year. No experience is needed to start—anyone can operate and turn out professional jobs. All operations are handled quickly, easily and accurately.



Sharpen These Professionally

with amazing

Foley Saw Filer

You can sharpen combination (rip and crosscut) circular saws, band saws, hand saws, crosscut circular saws—and do a perfect job every time without experience or special training. The precision Foley Filer does it for you automatically! A complete repair shop in one machine! Set up in basement or garage, work your own hours in your own way and earn big sparetime profits.

FREE BOOKLET TELLS HOW!

Free Book "Money Making Facts" shows just how you can start at home in spare time. Small investment—time payments if desired. Get this booklet—study it! Send coupon today. No salesman will call on you.

Foley Manufacturing Co., 216-5 Foley Bldg.
Minneapolis, Minnesota 55418

Send Free Booklet on ☐ Saw Sharpening Business ☐ Lawn Mower Sharpening

Name _____

Address _____

City _____ State _____ Zipcode _____

NO MATTER WHAT YOUR JOB IS TODAY

There's BIG MONEY to be Made In COLOR TELEVISION!

DUE TO SHORTAGE OF TRAINED MEN

Get into fast-growing field! Learn COLOR TV servicing at home in spare time. Many *earn cash* while training! Move ahead to a better job, a business of your own!

Get 20 Valuable Kits to Build 21" TV Set and Test Instruments!

Become expert the fast, easy way . . . by working on actual TV problems. Your training includes 20 valuable kits of parts and tools, yours to keep. Build a complete 21" TV set, tube tester, and electronic voltmeter as part of your training.

HERE'S HOW TO GET STARTED: MAIL COUPON TODAY FOR **FREE BOOKLET!**

Commercial Trades Institute
1400 Greenleaf Ave., Chicago, Illinois 60626

Dept. T-21

Rush my FREE booklet (without cost or obligation) on C.T.I. training for job opportunities in television-electronics—including COLOR TV servicing.

NAME_____

ADDRESS_____

CITY_____ ZONE___ STATE_____

Accredited Member National Home Study Council

Get Your "LITTLE GIANT" Handbooks

These five encyclopedias of practical facts are hard-bound, pocket-sized, fully indexed and loaded with diagrams, tables and "how-to" text useful to hobbyist and professional. Send check or money order NOW! (C.O.D. orders also accepted.) **Electrical Handbook,** 384 pp—$2. **Building Trades,** 371 pp—$2. **Mechanic's,** 383 pp—$2. **Civil Engineer's,** 368 pp—$2. **Shop Tables,** over 60 tables—$2. 15-day money-back guarantee if not satisfied.

INTERNATIONAL EDUCATIONAL SERVICES
Box 817, Scranton, Penna. 18515

"$7,108.50 NEW! FIRST YEAR Cleaning-Repairing RADIATORS."

—Hank Konter, Newcastle, Wyo.

Make $6,000-$9,000 a year servicing auto-truck-tractor radiators with Inland's new 1-Piece Radiator Shop. Easy to do entire job — TEST, CLEAN and REPAIR radiators. Only 11' 7" long. Inland, world's largest radiator equipment manufacturer, trains you free. Small down payment starts you. Easy-pay plan lets you pay from profits. Proved merchandising assures volume. Profitable department for garage or service station. Many set up Radiator Shop in garage at home, make good money working evenings. Write.
INLAND MFG. CO., Dept. PM-2, 1108 Jackson St., Omaha 2, Nebr.

Sidelights on AVIATION

Electronic aids in the cockpit have been introduced so rapidly lately that a story about them (beginning on page 110) had to be revised twice to update it while it was in preparation.

No sooner had the Bendix Corp. announced its device to help pilots "see" the runway through an impenetrable fog, than Trans World Airlines demonstrated another aid that would actually fly the plane down the glide slope automatically without the pilot ever seeing the runway—or touching controls—until the plane was 100 feet above the ground, the point at which the final flare-out is usually begun.

And no sooner had we absorbed this, and revised the story to reflect it, than United Air Lines put on still another demonstration, this time taking the plane, automatically, all the way down.

Like, "Look Ma, no hands!"

The United demonstration, visually, was by far the most jaw-dropping to those who witnessed it. The cabin door was open, and the pilot and co-pilot (it was a twin-jet *Caravelle*, incidentally) just sat there with their hands in their laps, occasionally raising them as if to show us, "See, I'm not touching anything," and that plane flew right on down all by itself, even flaring out and touching down.

We witnessed four such landings during the demonstration, but United says it has made more than 50 using the original Sud-Lear equipment without repair or replacement. The pilot said, understandably, that during his first landing using the system, "I had a firm hold on the release button," but after three or four he got more confidence in it. "Now," he says, "I can tell way out at the beginning of the approach that it's going to be good."

Our story, incidentally, is a well-researched one. Hans Fantel, who wrote it, travelled all the way to Geneva, Switzerland, to see one of the automatic navigation systems in action, and flew through a demonstration of the Bendix landing system. *PM*'s aviation editor rode along on the TWA and United demonstrations.

We just hope that nothing new is introduced between the time this is written and the time this issue hits the newsstands—like automatic take-offs.

Kevin V. Brown
Aviation Editor

TUNE UP ELECTRONICALLY ANY CAR EVER MADE...

domestic or foreign; compact or limousine; 4 cylinder, 6 cylinder or 8 cylinder; 6 volt or 12 volt.

With New Improved Model BT-162

DWELL TACHOMETER

NOTE: GIANT 6½" METER FOR EASY, ACCURATE READINGS

At last a streamlined instrument designed to provide the most important services for "tuning up" any and every car ever made from a Model A Ford up to and including the current automatic transmission cars produced today.

The Model BT-162 includes the very latest design Dwell Meter, working in conjunction with a dual range Tachometer and incorporating all modern improvements in circuitry design.

Assure easy starts, optimum performance and maximum gas economy with Model BT-162.

The Model BT-162 will perform the services specified below in addition to many other tasks too numerous to mention:

- Assure precise adjustments of points that are slightly worn or pitted.
- Indicate the most effective point setting without removing the distributor cap.
- Indicate the correct settings for external adjustment type distributors. (A feeler gauge cannot be used for making correct adjustments on this type of distributor since many manufacturers' specifications do not list the point gap in inches. They list only the dwell angle in degrees.)
- Insure maximum gas economy and quiet engine running. Read the exact RPM while the engine is in neutral position. Then adjust the carburetor in conformity with the car manufacturer's recommendations.
- To locate a "miss" you need only disconnect or "short" the spark plugs one at a time with the Model BT-162 switched to the Tachometer position.
- Cars with automatic transmissions function efficiently only if the fluid pressures are correctly maintained and since manufacturer's instructions always refer to RPM, the Model BT-162 (or an equivalent tachometer) is required to properly service automatic transmissions.

The Model BT-162 is the most complete unit in its price range ever produced. It comes absolutely complete, ready to use. Only **$29.95**

Specifications

The Model BT-162 provides three dwell angle scales; 0 to 45 degrees, 0 to 60 degrees, and 0 to 90 degrees. The three dwell angle ranges specified above make this instrument suitable for making accurate dwell angle adjustments on all 4 cylinder, 6 cylinder, and 8 cylinder cars, both foreign and domestic.

The dual range tachometer is extremely versatile since it provides both a low range of 0 to 1000 RPM, necessary for making precise carburetor adjustments and the high range tachometer, 0 to 5000 RPM suitable for making all other tests at high engine speeds.

SEND NO MONEY WITH ORDER
PAY POSTMAN NOTHING ON DELIVERY

Try it for 10 days before you buy. If completely satisfied then send $5.00 and pay the balance at the rate of $5.00 per month until the total price of $29.95 (plus small P.P. and budget charge) is paid. If not completely satisfied, return to us, no explanation necessary.

ACCURATE INSTRUMENT CO., INC.
Dept. D-392, 911 Faile St., Bronx, N.Y. 10474

Please rush me one Model BT-162. If satisfactory I agree to pay $5.00 within 10 days and balance at rate of $5.00 per month until total price of $29.95 (plus small P.P. and budget charge) is paid. If not satisfactory, I may return for cancellation of account.

Name_____

Address_____

City_____ Zone_____ State_____

☐ Save Money! Check here and enclose $29.95 with this coupon and we will pay all shipping charges. You still retain the privilege of returning after 10 day trial for full refund.

CLIP THIS

If you made $1500 less than you needed last year . . .

ANSWER THIS TEST!

This free, no obligation quiz is offered to introduce you to a *Tested money-making plan* that can supply extra cash in addition to your regular job, build a very profitable full time business. If you want to improve yourself financially, just check yes or no to these questions:

Yes	No	
☐	☐	Can you spare two-three hours per week to earn cash money?
☐	☐	Do you like doing things that are mechanical . . . working with your hands?
☐	☐	Is your regular job running out of advancement, with no chance to make $8,000 to $12,000 per year?
☐	☐	Do you wish you had a professional skill, something you could always count on for money?
☐	☐	Have you ever wished your job gave you the community standing of an independent businessman?

You may qualify to receive the Free Plan that outlines the fast, easy steps to this CASH INCOME opportunity. No prior experience needed. You get expert guidance and train at home at your own speed in spare time. Only plan of its kind that includes **valuable free equipment** that lets you make $4-$7 cash profit per hour while you learn! Not unusual for men to step into $12,000 careers with this professional experience. Clip entire ad and mail to:

BELSAW INSTITUTE,
105H Field Bldg., Kansas City, Mo. 64111

*Name*_____

*Address*_____

*City*_____ *State*_____

NO SALESMAN WILL CALL

We can help you become a **PROFESSIONAL MAN**

EARN **BIG MONEY** AS AN

ACCIDENT INVESTIGATOR

You can easily enter the professional field . . . earning up to $1,000 monthly . . . owning and operating your own business . . . or as Insurance Company Investigator with car furnished and expenses paid . . . with our easy-to-learn home training method.

It takes only a few spare-time hours a week while you're still working. No special education or previous experience necessary. There's a vital shortage of trained Investigators today. And, you will be given free employment help. Send for Free Book. No obligation. No salesman will call.

FULLY APPROVED BY ASSOCIATION OF HOME STUDY SCHOOLS

UNITED SCHOOLS, 1528-P, 416 Louisville, Monroe, La.

Items from All Outdoors

Fishermen have been writing for information about the Upperman bucktail jig, which Matt Mattfeldt (page 28, June 1964 *PM*) claimed was the best all-around lure in existence. We just had a letter from Matt and he writes: "Get ready for a jolt as Morrie does not fill orders. He can't make 'em fast enough. It's a good lure—that's why." But he did include the address: Morrie Upperman, 120 S. New York Ave., Atlantic City, N.J. So, interested readers can inquire directly—if you don't mind gettin' jolted.

✓ ✓ ✓

Water pollution is currently in the news as citizens' groups battle against two major electrical generation projects which allegedly threaten rivers in the East and Midwest. At such a time it is good to see a large industry recognizing the pollution problem and doing something about it. In Houston, Tex., where the Humble Oil & Refining Co. empties its waste water into the Houston Ship Channel, the company has installed a three-stage purification system that returns the water cleaner than when it was removed. The water is aerated and passed through a sequence of three lagoons before it is returned to the channel. This is an expensive project, but more than that, it is a major industry using natural resources in a responsible manner, adding something to that resource instead of just taking away, an attitude more industries should emulate.

✓ ✓ ✓

We sometimes grumble about buying a fishing license each time we fish in a different state, and feel that one license should be honored in all states in the same manner that a driver's license is honored. But a few items on the high cost of angling from the Sport Fishing Institute make our grumblings sound hollow. In England, on the River Wye, a salmon fishing lease on a 1130-yard stretch of river bank is up for sale at $5 per foot. And this is only one bank. But, even worse, on Norway's Maals River there is a spot called the Malangsfoss Pool that is about 250 miles above the Arctic Circle and is supposed to be the best salmon pool in the world. To fish this pool costs $435 a day!

Stuart James

Outdoors Editor

Act Now to Move Ahead in America's Fastest Growing Industry

NATIONAL RADIO INSTITUTE
Electronics Div., Washington, D.C. 20016 114-025

Please send me Sample Lesson and new NRI Catalog.
I have checked the fields of most interest to me.

- ☐ TV-Radio Servicing
- ☐ Industrial Electronics
- ☐ Complete Communications
- ☐ FCC License
- ☐ Math for Electronics
- ☐ Basic Electronics
- ☐ Electronics for Automation
- ☐ Aviation Communications
- ☐ Marine Communications
- ☐ Mobile Communications

Name_____ Age_____

Address_____

City_____ State_____ Zip Code_____

ACCREDITED MEMBER NATIONAL HOME STUDY COUNCIL

SAMPLE LESSON FREE

CUT OUT AND MAIL

Prove to yourself that learning Electronics TV-Radio at home can be exciting, fast, fun

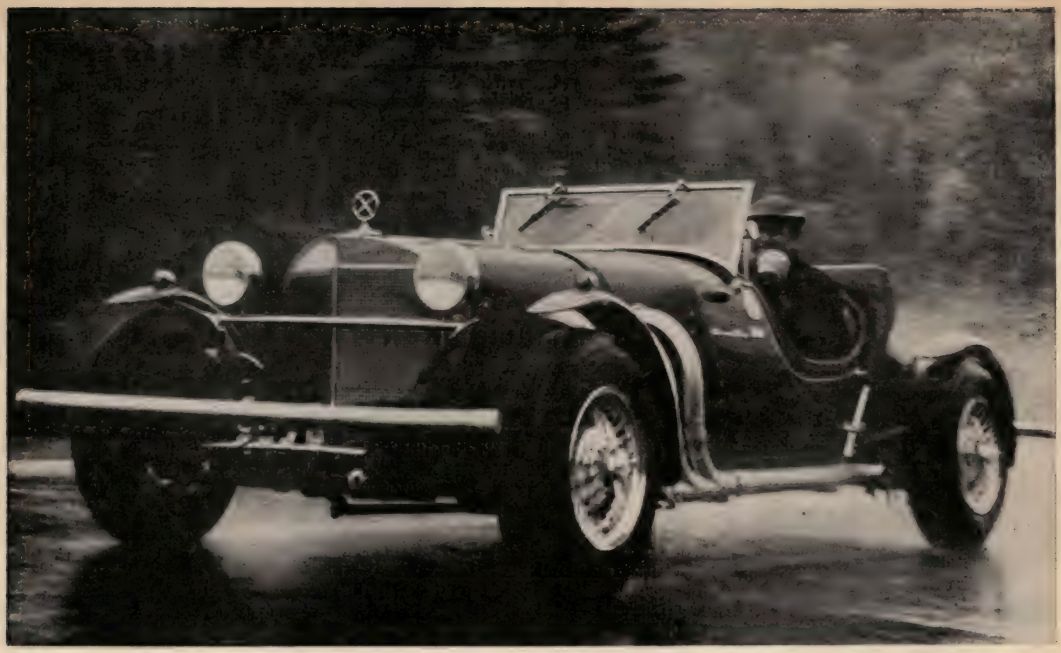
MYSTERIES OF ELECTRONICS COME ALIVE WITH EQUIPMENT NRI SENDS

Begin now an exciting adventure. Learn by doing with custom-designed training equipment NRI sends at no extra cost. You get on-the-job experience as you train at home in spare time. Custom designed kits are the exciting "third dimension" in NRI's training method, bringing to life the things you read about in "bite-size" programmed texts. Use NRI equipment "on the job" to help you earn $3 to $5 an hour extra fixing TV and Radio sets in spare time soon after you enroll. Get the facts about NRI, America's oldest, largest home-study Electronics school. Mail coupon above for free Sample Lesson and new NRI catalog.

After 50 years of perfecting and simplifying home-study training in TV-Radio, Electronics, NRI can prove to you that learning a technical subject is easier and more exciting than ever. Any man with reasonable ambition can learn Electronics the "3-Dimensional" NRI way. That's why NRI is offering to send you an actual "bite-size" sample lesson. Prove to yourself what so many thousands of others have found to be true; that NRI training is an absorbing, exciting adventure with higher pay and success as the rewards.

CASH IN ON NEED FOR TRAINED MEN

TV-Radio, Electronics-Automation, Communications-Broadcasting are revolutionizing our world, making it better, more comfortable, more exciting. Men who know Electronics are "cashing in"—not only financially but with brighter futures for themselves, their families. NRI training can be your stepping stone. Start your own TV-Radio Service business. Or get into broadcasting. Or help fill the need for skilled Electronics Specialists in business and industry. Whatever your need, ambition, education, there's an NRI training plan to help you achieve success. Get a fast start with the exclusive NRI Achievement Kit. Get all the facts about NRI "3-Dimensional" training, about opportunities in Electronics. Get your free NRI catalog and Sample Lesson. Mail coupon. There's no obligation. No salesman will call. NATIONAL RADIO INSTITUTE, Electronics Div., Washington, D.C. 20016.



HEFTY BONNET STRAP, outside exhausts hark back to the twenties. Hood panels are completely removable for ultimate in engine accessibility. In fair weather, windscreen can be folded down for wind-in-the-face thrills

Spotlight on the New

Its look-alike once tickled Dad's fancy. Now this modern bomb hits 60 m.p.h. in under 5 seconds

By John Fitch

PICTURE A RAINY DAY on the Lime Rock, Conn., race track. Tires hissing. Streams spraying from cycle-fendered wire wheels. The great louvered hood of the Excalibur SS stretching out ahead.

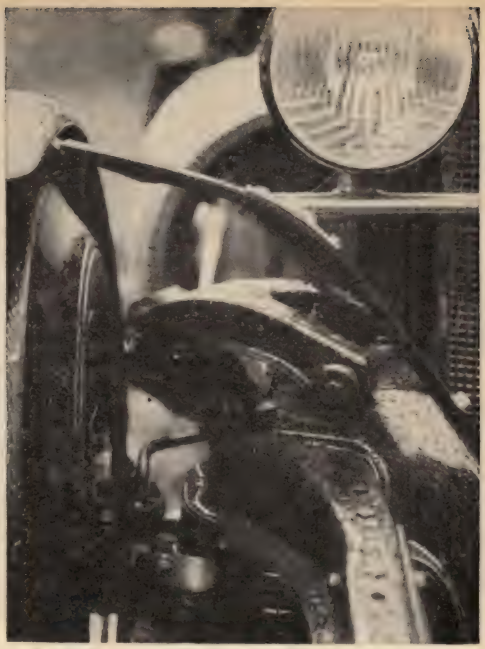
A vintage-car fan, watching from the sidelines, might mistake the big roadster for a 1927 Mercedes SSK—until he got a closer look. Surprise! Hidden by that starkly-styled body is a 327-cu.-in. Corcette V8 and modern Detroit chassis. Even more surprising, you can order one—if you have $6800 or more to spend.

I put the car through its paces on the twisting road course, and found it's a bomb. Touch the loud pedal in a turn and you immediately set up an oversteering slide, precisely controlled by the amount of throttle used. Acceleration? You can snake the car clear down the half-mile straight, thanks to 300 hp. and a mere 2350-pound all-up weight. This power-weight ratio exceeds that of anything you're likely to meet on the pike, including full-house Corvettes. If you want more, you can get the optional fuel-injected 375-hp. or Paxton-blown 400-hp. Corvette engine. But the 300-hp. cooking version is more tractable, and does 0-60 in under five seconds.

The transmission is a Borg-Warner all-synchro four-speed, one of the best. The chassis is from the most sophisticated Studebaker, the 109-inch-wheelbase Daytona.

The Excalibur SS harks back to older, sterner days when men carried hip flasks and motored in the open, by Jove. It doesn't try to be an everyday, go-to-work car. The room, convenience and comfort of ordinary modern automobiles simply can't be provided within the physical limitations of this type of car. But the certified car nut will happily put up with all sorts of inconveniences—and there are many. For example, there *is* a rag top, which is quite weatherproof. But in a rainstorm, by the time you unfold the metal frame and se-

ATTRACTIVE machined dash houses big, round speedo and tachometer, along with an ammeter, clock and gas level, oil-pressure, water-temperature gages



DAYTONA FRONT END carries disc brakes—effective on Studebakers and even more so on lightweight Excalibur SS. Individual headlights are chromed

Excalibur SS

cure the many snaps, you're wetter than if you'd gone on to your destination without delay.

With the top up, it's impossible to climb in with any semblance of dignity. Side curtains must be unsnapped and unzipped, after which you squeeze in over the side of the body (there are no doors). Once in, you're faced with the problem of resecuring the side curtains; the zipper and snaps, unfortunately, are on the outside. The top also leaves huge blind spots on either side, making a side-view mirror a must.

The nonadjustable seats offer no lateral support. The small, racing-type steering wheel is mounted close, but with the heavy steering, this is a necessity. Legroom is cramped. Headroom is also less than generous, and with the top frame directly over your head, a seat belt is called for.

The hand brake is a long reach under the right side of the dash, and the shift lever is too close and too far back. And you have to twist your clutch foot to clear the brake, but one soon gets used to this. The incredibly short, stiff travel of the clutch takes longer to get used to. It engages *right now*—fine for fast shifts on the open road, but nervous as a jumping bean in traffic. Gas and brake pedals are spaced for easy heel-and-toeing. Bad weather prevented a really thorough test of the brakes (discs in front, drums rear), but they felt fine.

The 1927 Mercedes SSK, after which the Excalibur was patterned, epitomized perhaps better than any other model those Teutonic fire-breathers that racked up victories from Tripoli to Sweden since before the turn of the century. My good friend, the late Rudi Caracciola, achieved a greater share of those victories than any other driver. To travel with him, even in modern cars on public roads, was to know what demands were put on the SSKs in their day. They won races, and they *had* to be tough.

I've driven an SSK in recent years. Though it was similar to the model that won the Mille Miglia—a 1000-mile race on second-rate Italian roads—its steering was incredibly heavy, the clutch stiff, the

(Please turn to page 34)

FREE! NEW CATALOG
Big Savings...
FAMOUS MAKES!
ACCORDIONS

BUY DIRECT... at Importer-to-You Prices
...save middlemen's profits!
5 DAY FREE TRIAL!

E-Z TERMS
LOW DOWN PAYMENT
Balance-Little as $8.77 a Month

Over 40
Standard and Electronic
Accordions-Amplifiers
for Students, Teachers, Professionals

SAVE UP TO ½
OFF RETAIL PRICES of Comparable Accordions

TRADE-IN
Your Old Accordion
BIG ALLOWANCE!

WORLD'S LARGEST EXCLUSIVE ACCORDION DEALER saves you more than you ever hoped possible on new famous-make Italian Accordions of your dreams! Because you buy DIRECT... Importer-to-You... save up to 50% OFF retail prices of comparable accordions. Compare our low prices... see and judge for yourself. Rush coupon for FREE Color Catalog and low Importer-to-You price list. See America's most exciting selection... *over 40 models.* Exclusive features! Full range of Colors! Newest styling! Get FREE 5-DAY PLAYING TRIAL IN YOUR HOME. If you decide to keep instrument, pay for it only pennies a day on E-Z terms. 100% Satisfaction Assured. Get FREE BONUS GIFTS for promptness... Free Home Study Course. Trade-in allowance.

FREE BONUS GIFTS
for promptness in ordering
- Year's Supply of Music
- Home Study Course
- Sturdy Music Stand
- Name in Chrome Letter
- Bellows Protector
- Music Portfolio

Let us prove how much more you save—thanks to our money saving Importer-to-You plan. You pay *NO* Teacher's or Salesman's commissions. We buy for less, save on high overhead... and pass the savings on to you. Mail coupon today for FREE Color Catalogs and Importer-to-You prices. No obligation.

ACCORDION CORPORATION OF AMERICA
Dept. R-25, 5535 West Belmont Ave., Chicago 41, Illinois

FREE
Color Catalogs ... Low Direct Importer-to-You Prices ... Rush Coupon Now!

Accordion Corp. of America, Dept. R-25
5535 W. Belmont Ave., Chicago 41, Ill.
Rush color catalog and "Importer-to-You" prices.

Name _____
Address _____
City & Zone _____ State _____
☐ Check if you have instrument to trade in.

Spotlight on the Excalibur

(Continued from page 33)

gearbox reluctant, the suspension harsh and imprecise. It drove like a truck. The crowning disappointment was the lack of response when the mighty compressors engaged with a banshee wail—and hardly anything happened. It was like a Disney cartoon in which a great cannon is prepared, carefully aimed and fired, whereupon an undersized projectile dribbles from the muzzle and plops fizzling to the ground.

I'm not saying the SSK was a fraud; the record book wouldn't allow it. The only explanation lies in the remarkable engineering advances since the late Twenties.

Two Plusses and a Minus

The areas in which this new Excalibur outpoints the Mercedes SSK are the smooth transmission and the flexible, light engine. However, the stock Studebaker chassis, used to save on costs, entails certain compromises. Spring rates were designed for a load of 3500 to 4000 pounds, instead of the 2350 pounds of the Excalibur. There's no substantial steel body to stiffen the frame—just a light aluminum shell on the prototype we tested. And the live rear axle and suspension were designed for a different ratio of sprung to unsprung weight. The result is a stiff ride on rough roads, frame flexing, cowl shake and a general feeling of looseness. Washboard bumps in a turn also induce side-hopping chatter in the too-heavy rear axle. Bad as all this sounds, it's far from intolerable for the vintage-car buff, who finds it all very true to type.

Our test car was the first one made, and was loaned to us by Don Allen Chevrolet in New York, an Excalibur distributor. Since this car was built, designer Brooks Stevens and his son, William, have anticipated most of my complaints. Production cars will have stiffer cowling with fiberglass body construction (except for the louvered hood, which will remain aluminum), four inches more legroom, softer spring rates with more wheel travel, and more seat and cockpit padding.

Why buy an Excalibur? A vintage-car collector, with luck, may find a restorable Mercedes SSK for $6000—and then the expense and trouble begin. Restoration can cost $5000 to $10,000 and many anguished months. He then has a machine that's delicate and expensive to maintain. The Excalibur has a modern engine and chassis for which parts and service are readily available. And it goes better and faster—and much longer. ★★★

You, too, can enjoy
this kind of money
in
your own business

"MADE $1200 ON ONE JOB"

Some make more, some less...

We help you start Your Own All-Year Business *Make BIG Money!..*

With our easily operated, highly efficient Wall Washer, G. H. Jones made $1200 on one school job. E. L. Goss took in more than $10,000 in one year. E. C. Taber wrote, "*I made $400 gross in two weeks.*" And no wonder...this machine washes walls 6 times faster and better than by hand—with no mess...no drop cloths.

Your Money-Making Opportunity • We want more men to go into this profitable business for themselves and enjoy independence...freedom from layoffs and bosses. Customers everywhere—homes, offices, schools, churches, hotels, etc. How much you earn depends largely on you, but we help you to start and work with you for your success. What you take in is mostly profit. No need to rent shop or office; operate from home. Start spare time until full time is justified.

Ours is NOT a Lease Arrangement • You are free to operate in an independent manner. *You* sign no contract. *You* own the Wall Washer outright and are always *your own boss*...and every dollar you take in is *yours* to keep. *You* pay no fees, or dues, or royalties to anyone, and enough supplies come with it to return far more than your investment. Many earn its cost in a week or two. It costs nothing to get the details...write **TODAY.**

Lose No Time!
Send Coupon Today for All the Facts!

READ WHAT OUR ASSOCIATES SAY...

L. W. MOORE, a North Carolina Associate—"Last year we did nearly $17,000 gross. By May 31st this year we topped $11,000, so we are surely up in the $20,000 bracket. The Von Schrader Company is tops, and I will highly recommend them straight down the line."

An Associate from New York—"Your promptness and thoroughness in answering my many requests for assistance have been of tremendous help in getting me on a profitable basis so quickly."

VERNON E. SWEATT, an Indiana Associate—"My largest single job so far was $479, which I completed in a little over 20 hours."

MAIL COUPON TODAY FOR FREE BOOK

VON SCHRADER MFG. CO.
210 "W" Pl., Racine, Wisconsin

Please rush your **FREE** booklet about your WALL WASHING MACHINE and how I can start *my own* permanent, profitable business.

Name_____

Address_____

City_____ Zone____ State_____

Noteworthy New INVENTIONS

By M. J. Pedersen

An airplane with two sets of wings, one set for flying at supersonic speeds and the other for flying slower than the speed of sound, earned patent 3,155,344 for Richard Vogt, Santa Barbara, Calif. For subsonic flight, the wings, perpendicular to each other and mounted atop the fuselage like a propeller on a beanie hat, are swiveled hydraulically so that the long pair stick out and the short pair line up with the fuselage. For supersonic flight the positions are reversed. Though capable of flying at very high speeds, the aircraft will still be able to take off and land as easily as a conventional plane.

Removable sleeves, attached to a shirt or blouse by a zipper hidden from view, permit the apparel to be worn sleeveless or with sleeves. Isaac Rosenberg of Clayton, Mo., receiving patent 3,154,790 for his invention, foresees a long-sleeved shirt or blouse that could be unzipped in sections to become short-sleeved or sleeveless.

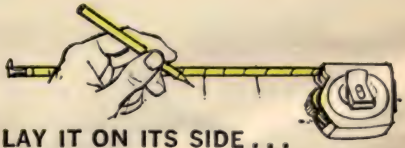
Sensing through the fingers, using a "tactile communication" system, has possibilities for use by the blind. The coded messages consist of vibrations which the receiver feels with his fingertips. A previous patent describes how the vibrations are coded. Awarded patent 3,157,853 for Prof. Joseph Hirsch of Santa Ana, Calif., the system has other applications, such as enabling the deaf to "hear" and in communications between space vehicles.

Three "magnetic pumps"—each small enough to fit into an eggshell with room to spare—may produce magnetism so strong that several hundred pounds of equipment would be needed to produce equivalent fields by conventional means. Built with superconducting materials, which offer no observable resistance to an electric current at temperatures near absolute zero (459.7 degrees below zero F.), the devices received patents 3,158,792-4 for Paul S. Swartz and Carl H. Rosner of General Electric Company, Schenectady, N.Y. Superconductors also resist

STANLEY LIFE GUARD YELLOW™

Much more than just another locking device! Locks on blade, not on drum. Eliminates slippage in both directions.

Much more than just a yellow-colored blade! Clad in super-tough Mylar*. Lasts up to 10 times longer. Resists abrasion, dirt, oils and most solvents. Easier reading, too. At better stores everywhere. Stanley Tools, Division of The Stanley Works, New Britain, Connecticut. In Canada: Hamilton, Ontario.



LAY IT ON ITS SIDE...
Rule lies flat, easy to mark off. Blade stays put; doesn't snap back.

HOOK THAT "GRIPS"
because serrations and burrs help prevent it from slipping off smooth surfaces. Strong, too; 100-pound pull won't bend it.

*DuPont Trademark for its polyester film

STANLEY

penetration of a magnetic field into their interior, which is the key to the performance of the new pumps.

Three-in-one vaccine for dogs simultaneously guards against rabies, distemper and hepatitis. Believed to be the first combination of three live, weakened viruses, each retaining its specific immunizing properties, the vaccine earned patent 3,155,589 for Eben A. Slater, St. Joseph, Mo.

Footsore horses may find relief with a liquid massage machine which won patent 3,155,072 for Walter F. Owens of Detroit, Mich. Four bootlike containers fit on each of the horse's legs, providing a liquid bath to take the kinks out of strained tendons and muscles.

An underwater weed killer to halt the growth of seaweed along shorelines earned patent 3,151,463 for David R. Talbott, Annapolis, Md. The apparatus, consisting of a pump and a series of hoses with holes, uses water or air pressure jets to agitate materials on the sea bed. The muddy cloud thus created blocks the sun and has to be maintained only during the spring germinating period for the treated area to remain weed-free for the remainder of the year.

Automobile exhaust may solve many drivers' snow and ice problems this winter, through a device which earned patent 3,151,613 for Howard H. Howard, New Rochelle, N. Y. Connecting a strip of hose with a funnel-shaped attachment at each end to a car's tail pipe enables the hot exhaust gases to melt ice around wheels, clean windshields and free frozen locks.

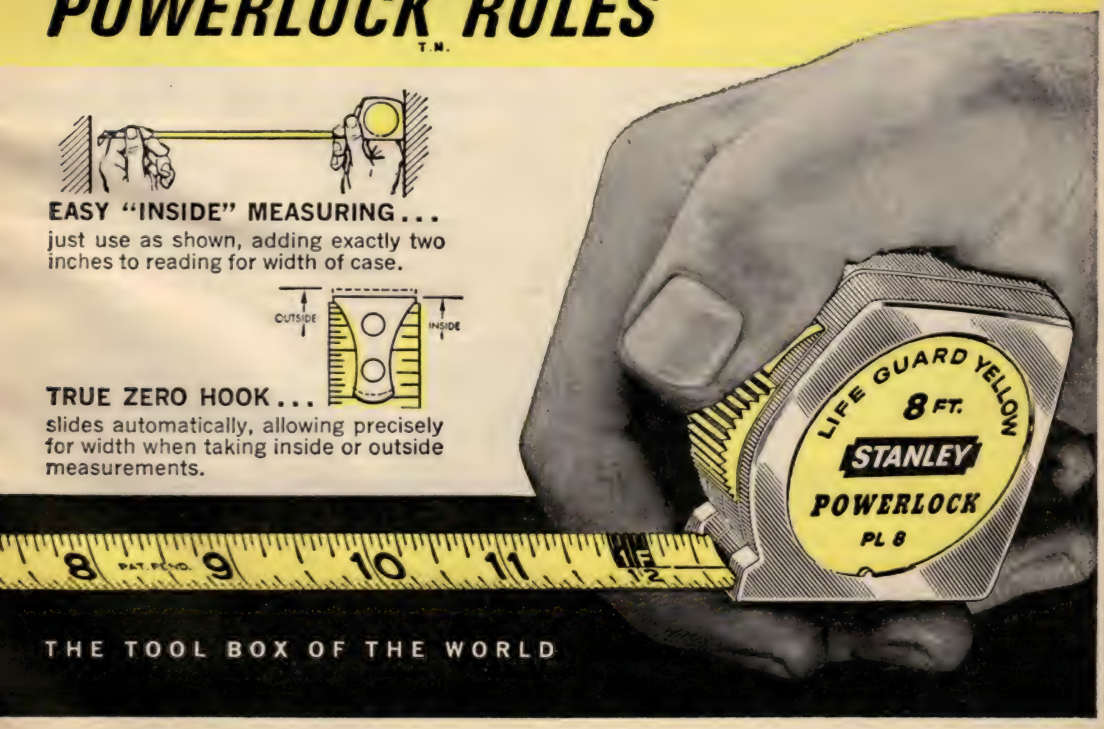
Desalting water according to a method which earned patent 3,147,598 for Joseph R. Wilson of Pittsburgh, Pa., produces pure water, as well as useful power. The pressurized vapor formed by heating the impure water, together with the pressurized steam causing the vaporization, is reheated and then used to turn a steam turbine. The salty impurities, when removed from the vapor and collected in dry form, can also be used.

Reducing cholesterol levels is possible —in chickens, at least. Earning patent 3,148,114 for Marvin J. Fahrenbach and Benjamin A. Riccardi of Pearl River, N.Y., the method consists of administering daily Irish moss in dosages from 50 mg. to 500 mg. per kilogram of body weight.

POWERLOCK RULES T.M.

EASY "INSIDE" MEASURING . . .
just use as shown, adding exactly two inches to reading for width of case.

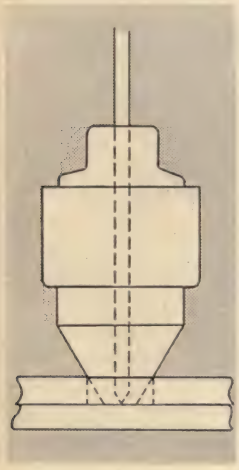
TRUE ZERO HOOK . . .
slides automatically, allowing precisely for width when taking inside or outside measurements.



THE TOOL BOX OF THE WORLD

Shopping for Tools

QUICK SPOT speeds job of transferring locations for 3/16 to 1-3/16-in. holes from one piece of work to another. You set the cone-shaped tool in hole to be transferred and tap the center rod with a hammer. Tool automatically centers itself. Sells for $14.95. J. S. Slocomb, 68 Matson Hill Rd., S. Glastonbury, Conn.



COMPACT ENGRAVER, the Model 290, provides an easy way to mark tools, sports equipment, jewelry, etc. Works on steel, copper, brass, aluminum, glass, plastics, wood, ceramics and other materials. A dial on the housing permits quick adjustment of the length of the stroke. Delivers 7200 strokes a minute. Costs $14.95. Dremel Manufacturing Co., Racine, Wis.

THE SPINNING RATCHET can be used as a conventional ratchet, a right-angle spinner, or both simultaneously. Used in combination with standard ¼-in. drive sockets and spinner handles, it permits easy driving or removal of nuts in tight corners. Costs $7.95. Amtronix, Inc., P.O. Box 44, Chula Vista, Calif.

DRILL REMOVES PAINT. With the Whirl Away attachment your ¼-in. electric drill can remove paint and scale from concrete walls, boats, etc. It employs a series of pronged cutter wheels that chip the surface clean. Sells for $15. Extra cutters are $2.50 a set. R. C. Collins, 746 N.E. 67 St., Miami, Fla.

TRAVELER'S TOOL KIT contains a plastic handle and five interchangeable blades—a gimlet, awl, two regular screwdrivers and a Phillips Head screwdriver. They come in a zippered leather case that's ideal for toting in your pocket. Mini-Tool costs $1.50 postpaid. Power Sales Company, Box 461, Ardmore, Pa.

MAKE MORE MONEY AT HOME IN YOUR OWN BUSINESS
in spare time

LEARN UPHOLSTERY

MEN . . . WOMEN . . . ALL AGES
PROFITABLE BUSINESS
BIG PAY JOB
SECOND INCOME
NO EXPERIENCE OR BIG CAPITAL REQUIRED!

FREE TOOLS

EARN AS YOU LEARN RIGHT FROM THE START– Make beautiful Custom Furniture. Turn *old* furniture into new for *BIG* PROFITS. Reupholster chairs, divans, footstools. Recover furniture of all types. Make Slip Covers, Drapes, Cushions. Your home is your workshop. No overhead and no expensive equipment.

SKILLED UPHOLSTERERS URGENTLY NEEDED NOW! Shops desperate for help! Can't satisfy Upholstery demand created by population explosion, gigantic new home, apartment, hotel, motel, office, restaurant construction. Upholsterers earn TOP MONEY, are needed *Everywhere!*

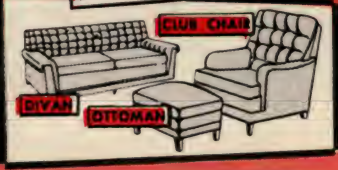
WE WILL GIVE YOU EVERYTHING: 1) Most Modern, Complete Course ever offered. 2) Complete Set of Tools. 3) Practical "Learn-by-Doing" Projects. 4) Professional guidance every step of the way.

GET THIS **FREE BOOK** YOURS FOR THE ASKING!

Air Mail Coupon for FREE Illustrated Book, Useful Sample Lesson and Plan for Operating a Profitable Business at Home . . .

All 3 are Yours FREE!

FREE materials, fabrics, tools, supplies to make a ROOM-FULL of beautiful furniture like this . . . YOURS to KEEP or SELL!



BE YOUR OWN BOSS– Start small, at home . . . Enjoy a good income for life! • Send for your FREE ILLUSTRATED BOOK and SAMPLE LESSON . . . TODAY!

MODERN UPHOLSTERY INSTITUTE, BOX 899-LC, Orange, California

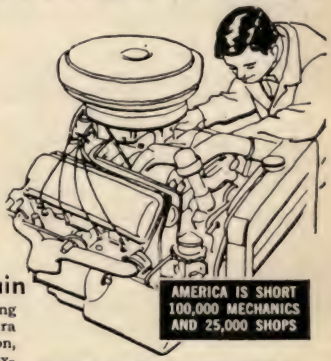
MODERN UPHOLSTERY INSTITUTE
Box 899-LC, Orange, California
Please send FREE Illustrated Book and SAMPLE LESSON. No obligation — No salesman will call.
Name _____ Age _____
Address _____
City _____ Zone _____ State _____

AMAZING NEW HOME TRAINING PLAN IN AUTO REPAIRING

Important news for the man who needs a short cut to a better job, more money and greater security

No longer need you stand by as trained mechanics take their choice of thousands of good job openings. Now you can get ready for more money, steady work and a bright future, by training at home in spare time.

CTI's newly-improved home study course is clearly written, expertly illustrated, easy to understand. It provides *30 Job Experience Projects* to take you from lessons to actual engine work. It includes valuable tools and test instruments. You learn automatic transmissions. You learn by practicing. *Mail coupon for FREE catalog!*



15 KITS OF TOOLS AND TESTING INSTRUMENTS

MECHANIC'S TOOLS INCLUDING SOCKET SET AND TRAY
TORQUE WRENCH
VISO-ANALYZER (VOLT-AMPERE TESTER)
CAM ANGLE TACHOMETER
VACUUM GAUGE AND FUEL PUMP TESTER, COMPRESSION TESTER
STARTER CURRENT INDICATOR
BATTERY CELL TESTER
POWER TIMING LIGHT

CTI training gets results. You receive quality tools and test equipment, and instructions on how to use them. You also get your choice of either Diesel Mechanics or Body-Fender Rebuilding training.

COMMERCIAL TRADES INSTITUTE • CHICAGO, ILL. 60626

Earn Money as You Train

Many students begin repairing after a few lessons. They earn extra money—which helps pay tuition, buy extra equipment. They get experience. It's easy to develop skill the CTI way.

Practical Instruction

When you enroll, a trained instructor helps you when you need it. No wonder so many students learn rapidly, soon earn diplomas!

HERE'S WHAT STUDENTS SAY

"Am proud I finished course. Have 2 job offers."—*Barden Vance, Ind.* "Am now a mechanic. Made $800 during training."—*Ronald Wharton, Md.* "Started a small business. Have 2 part-time partners."—*John Reed, Cal.* "I earn twice what I used to."—*Jerome Slowik, Ill.*

MAIL THIS COUPON TODAY FOR FREE FACTS

COMMERCIAL TRADES INSTITUTE Dept. A-519
1400 GREENLEAF AVENUE
CHICAGO, ILL. 60626

Mail me your booklet, *Make Big Money in Auto Mechanics;* and *Lesson Samples.* Also tell me how I can earn as I learn.

Name _____ Age _____
Address _____
City _____ Zone _____ State _____
Accredited Member National Home Study Council

Heating with Gypsum Board

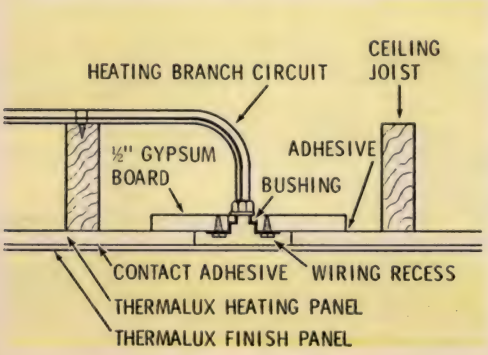
A NEW ELECTRICAL HEATING system employs gypsum board ceiling panels which contain factory installed radiant heating filaments. Except for electrical connections, installation is much the same as applying a standard two-layer gypsum board ceiling.

In each panel, the heating element is a thin layer of graphite sandwiched between two layers of asbestos insulation. The 120-volt a.c. or d.c. current is carried to this filament by two copper electrodes embedded near the panel edges. Operating temperature is about 100° F.—cool enough to touch. Heat output is 15 watts, or 50 B.T.U.s per square foot.

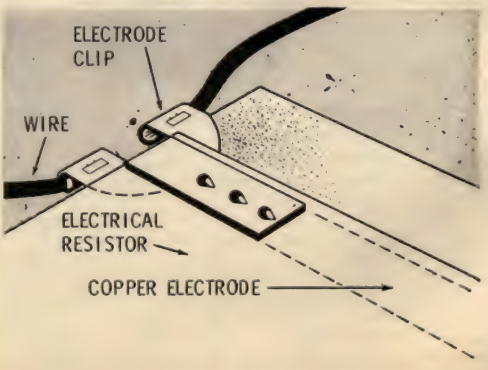
The panels are a half-inch thick, four feet wide and 10 or 12 feet long. They are fastened to the ceiling joists with special nylon-insulated nails, and may be cut to any length with a knife. Special filler panels (page 42), may be cut to any width between 24 and 48 inches.

(Please turn to page 42)

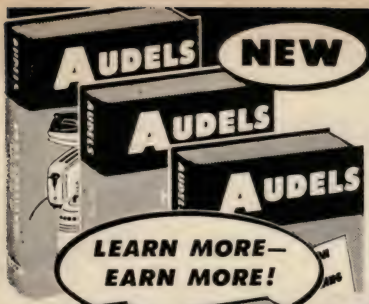
CONDUIT THAT CARRIES WIRING to panels terminates in special bushing set in standard wiring recess



WIRING CLIPS designed specifically for new panels are attached to the electrodes after each panel is up



NEW AUDEL Skill-Building GUIDES



HOME APPLIANCE SERVICE GUIDE

How to fix all large and small appliances both gas and electric. Covers basic principles, servicing and operation. Tells how to locate troubles, take appliances apart and reassemble. Revised, up-to-date edition. Hundreds of illustrations. 832 pages. $6.95

Circle No. 2 in Coupon

HOME GAS HEATING & APPLIANCE MANUAL

A practical guide for the installation, maintenance and repair of all types of gas heating equipment and appliances. Detailed instructions and illustrations for trouble-shooting and repair. All latest models covered in this new book. Illus. 320 pages. $3.50

Circle No. 59 in Coupon

REFRIGERATION & AIR CONDITIONING GUIDE

Full information on servicing, operation and repair of all systems and machines, freezers, lockers, water coolers, etc. Describes basic principles of every type of unit. Contains dozens of tables with vital data Fully indexed. Ill. 1090 pgs. $6.00

Circle No. 14 in Coupon

AUTO MECHANICS GUIDE

Ready guide for mechanics, students, car owners. Theory, construction and servicing of modern cars. 1000 Illus. 1132 pages. $6.00

Circle No. 1 in Coupon

FOREIGN AUTO REPAIR MANUAL

Complete, up-to-date service data for all the popular imports: English, French, German, Italian, Swedish. Illus. 592 pages. $5.00

Circle No. 53 in Coupon

MASONS AND BUILDERS GUIDES

Four practical vols. for bricklayers, stone masons, cement workers, plasterers, tile setters. 2000 Illus. 1440 pages. Set $10.50

Circle No. 26 in Coupon

PLUMBERS & STEAMFITTERS GUIDES

Four vols. of ready reference for plumbers, steamfitters, gas fitters, sheet metal workers. 3600 Illus. 1833 pages. Set $10.50

Circle No. 6 in Coupon

TELEVISION REPAIR MANUAL

Latest information on TV circuits & how to install, troubleshoot and repair all TV sets, including color. Illus. 512 pages. $5.00

Circle No. 3B in Coupon

RADIOMANS GUIDE

Comprehensive coverage of radio theory, circuitry, equipment, troubleshooting and maintenance. Illus. 448 pages. $5.00

Circle No. 3A in Coupon

CARPENTERS and BUILDERS GUIDES

Four all-inclusive vols. Modern construction and inside trade information for carpenters, builders and all woodworkers. 3700 Illus. 1900 pages. 4-Volume Set. $10.50

Circle No. 8 in Coupon

OUTBOARD MOTOR & BOATING GUIDE

Practical details on all phases of outboard motor repairs and maintenance. An essential boating tool! Illus. 414 pages. $4.00

Circle No. 49 in Coupon

MACHINISTS and TOOLMAKERS GUIDE

Modern shop practice for machinists, toolmakers, draftsmen. How to set up & run all machine tools. 1256 pages. $6.95

Circle No. 12 in Coupon

MATHEMATICS FOR MECHANICS

A complete guide to the mastery of practical math. Simplified method makes learning fast and easy. Ill. 672 pgs. $4.95

Circle No. 11 in Coupon

new ELECTRIC LIBRARY

10 volume electrical encyc. Answers questions on thousands of electrical problems. 9000 Ill. 5558 pgs. Set $25.00

Circle No. 15A in Coupon

PRACTICAL ELECTRICITY

Complete handbook; practical, simplified, ready reference on all electrical subjects. 2600 Illus. 1052 pages. $5.95

Circle No. 4 in Coupon

BLUEPRINT READING

For mechanics and construction men. Step-by-step explanation of how to read all types of blueprints; easy to understand. Ill. 430 pgs. $3.95

Circle No. 25 in Coupon

WELDERS GUIDE

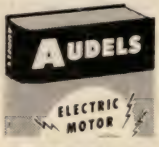
Concise, practical guide to theory, operation and maintenance of all types of electric & oxy-acetylene welding. Illus. 588 pages. $4.95

Circle No. 10 in Coupon

PROGRAMMED BASIC ELECTRICITY

Revolutionary new programmed technique; fastest method for learning all phases of electricity. 272 pages. $4.00

Circle No. 54 in Coupon



ELECTRIC MOTOR GUIDE

Covers hookups, control, maintenance and troubleshooting of all types of motors. Fully indexed. 600 Ill. 1036 pgs. $5.95

Circle No. 27 in Coupon

ADDITIONAL IMPORTANT TITLES

Circle the numbers wanted in the MAIL ORDER coupon below. All books are sent for FREE EXAMINATION.

No. 5	TRUCK & TRACTOR GUIDE. 908 pages	$5.95
No. 13	RADIO-TV LIBRARY. 2 Vols. 960 pages. Set	9.50
No. 7	PAINTING & DECORATING MANUAL. 592 pages	4.95
No. 48	GAS ENGINE MANUAL. 468 pages	4.00
No. 28	OIL BURNER GUIDE. 420 pages	3.95
No. 9	DIESEL ENGINE MANUAL. 544 pages	6.00
No. 29	SHEET METAL PATTERN LAYOUTS. 1152 pages	7.50
No. 40	PUMPS, HYDRAULICS, AIR COMPRESSORS. 1719 pages	6.95
No. 42	MILLWRIGHTS & MECHANICS GUIDE. 1166 pages	6.95
No. 34	Q & A FOR ELECTRICIANS EXAMINATIONS. 288 pages	3.50
No. 37	POWER PLANT ENGINEERS GUIDE. 1036 pages	5.95
No. 41	HOUSE HEATING GUIDE. 1074 pages	5.95
No. 13	WIRING DIAGRAMS FOR LIGHT & POWER. 320 pages	4.00
No. 38	Q & A FOR ENGINEERS & FIREMANS EXAMS. 536 pages	4.00
No. 30	SHEET METAL WORKERS HANDY BOOK. 398 pages	3.95
No. 52	DOMESTIC COMPACT AUTO REPAIR. 816 pages	5.95
No. 36	ELECTRIC DICTIONARY. 550 pages	3.50
No. 44	MECHANICAL DICTIONARY. 740 pages	6.95
No. 61	PRACTICAL GUIDE TO MECHANICS. 384 pages	4.00
No. 69	ARCHITECTS & BUILDERS GUIDE. 384 pages	4.00
No. 57	PRACTICAL CHEMISTRY. 896 pages	5.95
No. 56	HOME MODERNIZING & REPAIR GUIDE. 288 pages	2.95
No. 55	HOME WORKSHOP & TOOL HANDY BOOK. 448 pages	5.00

7-DAY FREE EXAMINATION

SEND NO MONEY Pay the postman nothing! We are glad to send you any of the Audel Guides for absolutely FREE examination in your own home. We take all the risks and leave all the decisions up to YOU. There is no obligation! If you decide to keep the books of your choice you may pay for them under our astounding easy-pay plan of only $3 a month.

HERE IS ALL YOU DO—IT'S EASY TO ORDER: In the *No-Risk* Mail Order Coupon at the right just draw a circle around the number of Audel Guides you want us to send you for FREE EXAMINATION. We will send them to you at once to help you build a brighter future by increasing your SKILL. If you are not COMPLETELY satisfied, return the books, and that will end the matter! NO STRINGS OR CATCHES TO THIS OFFER.

THEODORE AUDEL & CO.
division of HOWARD W. SAMS & CO., INC.
Indianapolis • New York

MAIL THIS NO-RISK COUPON TODAY!

THEODORE AUDEL & CO.—*Self Improvement Publishers Since 1879*—
4300 W. 62nd Street, Indianapolis, Indiana 46206 P-25

Please mail me for 10 days' FREE EXAMINATION the books I have circled at right. I agree to mail $3 in 10 days on each book or set ordered, and to further mail $3 a month on each book or set ordered until I have paid the purchase price, plus shipping costs. If I am not completely satisfied with my Audel Guides I may return them.

1	2	3	3A	3B	
4	5	6	7	8	
9	10	11	12	13	
14	15A	25	26	27	
28	29	30	34	36	
37	38	40	41	42	
44	48	49	52	53	
54	55	56	57	59	
			61	69	

Name _____
PLEASE PRINT

Address _____

Occupation _____

Employed By _____

☐ **SAVE SHIPPING COSTS!** Check here if you enclose complete payment with order (plus sales tax, if any). We pay postage charges. You have same return privilege.

☐ I have bought Audel books before

ARROW®
All-Purpose
STAPLE GUN TACKERS
HEAVY DUTY
Model T-50 ONLY $12.50
OTHER MODELS FROM $4.95
TAKES 6 STAPLE SIZES: 1/4", 5/16", 3/8", 1/2", 9/16" and CEILTILE
SHOOT A STAPLE WHEREVER YOU'D DRIVE A NAIL!
FASTER! CHEAPER! BETTER!
for 1001 Home Improvement Fastening Jobs:
Ceiling Tile, Insulating, Upholstering, Screening, etc.
UPHOLSTERING
CEILING TILE
INSULATING
Available at hardware, lumber, building supply, stationery and other retail outlets.
ARROW FASTENER CO., INC.
One Junius Street • Brooklyn 12, N. Y.

Heating with Gypsum Board

(Continued from page 40)

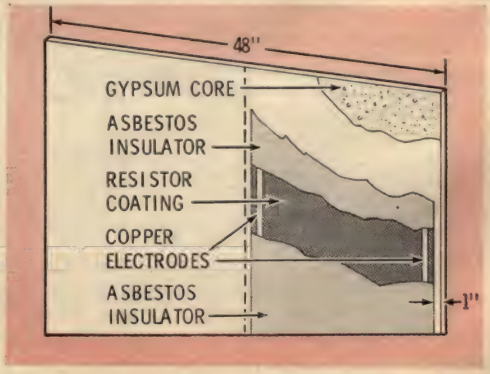
WIRES THAT CONNECT PANELS are stapled to ceiling joists. Space above joists should be well insulated

Once in place, the panels are wired in parallel by means of clips attached to the electrodes. Wires are fastened to these clips with a crimping tool.

After all connections are made, finish panels—quarter-inch gypsum board without filaments—are contact cemented over the heating panels. Joints are taped, and the ceiling can be decorated with any interior paint, but not acoustical tile. The manufacturer says water from a leaking roof won't damage the filament.

The system, called Thermalux, is being test marketed by U.S. Gypsum, 101 South Wacker Drive, Chicago 6, Ill. According to U.S.G., installed cost runs 50 to 80 cents a square foot, is competitive with other heating systems. But Thermalux, like other electrical radiant systems, has no piping, ducts, radiator or furnace.

FILLER PANEL is same as full-width heating panel, but half-size filament allows cutting to odd widths



NOW! RUN YOUR CAR WITHOUT SPARK PLUGS

Get Up to 31 More Horsepower, 8 More Miles Per Gallon—

USING ONLY REGULAR GAS!

Yes—this revolutionary new FIRE INJECTION SYSTEM—installed in 15 minutes, must deliver maximum power and economy WITHOUT CHANGING TO HIGH-PRICED PREMIUM GAS — must give you up to 31 more HP, 8 more miles per gallon for the life of your car! See unprecedented GUARANTEE!

Your car runs because gasoline is fed into the cylinders where a spark causes it to fire. This action causes the gas to explode—this explosion pushes down the piston. Now here is the important thing to you. The larger this spark is, the more powerful the explosion. The more powerful the explosion, the more power you get from a given amount of gasoline. Poor explosion means wasted gas—loss of power, poor getaway, bad starting, a sluggish car. Good explosion means more miles per gallon, more horsepower, blazing pickup, instant starting; an exciting car to drive!

WHAT CONTROLS YOUR ENGINE'S EFFICIENCY

Your spark plugs control the efficiency of that explosion. And not only do they give a small, weak spark to begin with, but they get worse every mile you drive. And that you can see for yourself. Put a new set of spark plugs in your car and then look at them at 100 miles, at 1,000 miles, at 5,000 miles.

Every time you look you will see more filth and carbon and you will see more of the electrode burning away. Why, some of the new high compression engines can burn up a set of plugs in a couple of thousand miles of driving. Now you ask yourself how a weak, inefficient spark from a filthy, burned-out plug can possibly give you the kind of flashing, economical performance you want.

STOP USING SPARK PLUGS — NOW!

Now read very carefully what we're going to suggest . . . **that you stop using spark plugs in your car!** That's right—get rid of them—forever. But—if you —get rid of your spark plugs, what will make the engine run?

Well, please remember that if you were told a couple of years ago that your car could run without a carburetor you wouldn't have believed it—yet today you can have gas injection and get far more mileage, efficiency and power from less gas—and in a few years gas injection will have completely replaced the carburetor on most cars. In the same way, now is the time to replace your old-fashioned, temporary, inefficient spark plugs with a modern, efficient, permanent fire injection system, and you can do it yourself in 15 minutes if you've never handled a tool in your life!

MECHANICS AND ENGINEERS — READ THIS CAREFULLY

Now, this fire injection system is so inexpensive that it can pay for itself in gas savings alone in one month of driving. Forget, for the moment, about the extra pep, power and performance you are going to get. Forget about the savings in spark plug servicing and replacement, the savings in wear and tear on your pistons and cylinders that come from unburned gas washing the protective oil coating off the cylinder walls. Just remember that this fire injection system will **pay for itself in gas savings alone in a single month of driving.** Here's how:

A spark plug jumps a spark of electricity across an air gap; this is most wasteful, and limits the size of the spark.

A fire injection fires on the surface of an electrical conductor. You get a heavy, powerful flame that will not blow out at pressures far greater than those created by even the highest compression engine!

On ordinary spark plugs the air gap is always getting bigger, wasting power and gas. Your plug is constantly accumulating filth and carbon because of inefficient ignition.

A fire injection has no air gap and no electrode to burn away. It never needs cleaning or setting; it actually becomes more efficient with use. It will actually outlast your car, delivering maximum efficiency without servicing or replacement. There is no waste gasoline, no loss of power.

NOW — USE REGULAR GAS!

With ordinary spark plugs you are using, or should be using premium gas, which costs from 4 to 8 cents more than regular gas.

With fire injectors regular gas will give you up to 8 more gas miles per gallon, up to 31 more horsepower, plus easier starting in all weather.

Ordinary spark plugs have to be replaced regularly. In some of the new high compression cars, a set of plugs will burn up in two months.

A fire injector installation is guaranteed for the life of your car, without cleaning, servicing or replacing.

HERE IS POSITIVE SCIENTIFIC PROOF!

Now, when you get your set of SA FIRE INJECTORS, here is all you do. If you have automatic transmission, make a note of how fast your car crawls forward when it is in the drive position, with the motor idling. If you have a

sports car, a racing car or a boat, make a note of the RPM's as indicated on the tachometer when the engine is idling.

If you have a regular transmission, put your car in low gear on a level road and notice its speed with the motor idling. Next, take any inexpensive auto spark plug wrench and remove your spark plugs. **You'll never need them again!** Just screw your injectors right into the spark plug openings. Then—no matter what kind of gas you have been using — fill your tank with the poorest regular gas you can buy. That's all you have to do to see the most amazing results you could ever imagine in all the years you have driven an automobile!

CHECK YOUR RESULTS CAREFULLY!

If you have automatic transmission—now put your car in drive and let your engine idle. If your car stood still with spark plugs, it will move **forward at from 4 to 6 miles per hour;** that means that the amount of gas that just kept your engine turning over will now **carry you up to 6 miles at no cost to you!**

If you have a racing or sports car or a boat, your RPM's will increase **up to 200 more** at idling—**up to 300 more** at higher speeds.

If you have regular transmission, in low gear and with your motor idling YOUR CAR WILL MOVE FORWARD 4 TO 6 MILES PER HOUR FASTER. In other words, no matter what you drive, here is absolute proof that you can go further, faster and cheaper when you put proven SA FIRE INJECTORS in your car!

CHECK THESE DIFFERENCES

SPARK PLUG

Fires across air gap
Wire electrode burns away
Carbon ruins firing tip
Needs cleaning and setting
Needs periodic replacing
Needs premium gas
Must have exact heat range
Spark blow out under pressure

FIRE INJECTOR

NO air gap required
NO wire electrode
NO tip deterioration
NO cleaning or setting ever
NO replacing
NO premium gas needed
NO heat range
NO blowing out even at highest compressions

GUARANTEE

Take your set of SA FIRE INJECTORS and install them immediately; then give your new injection system every test you can think of . . . starting—acceleration — gas mileage — motor pep and smoothness for 10 full days. You must get more horsepower—more miles per gallon—increased engine RPMs—faster starting, blazing acceleration, freedom from knocks and pings, easier starting in all kinds of weather . . . AND DO ALL OF THESE THINGS ON REGULAR GAS.

If any SA FIRE INJECTOR does not continue to deliver maximum performance for as long as you drive your present car, we will replace it free of charge.

Order Your Fire Injectors Now!

If you're the kind of driver who wants his car to move when he steps on the gas—not 30 seconds later—if you like your car to start when you touch the starter button—not after you grind your battery down, if you want every nickel's worth of mileage from every single gallon of gas you pay for—instead of wasting it in the firing chamber; if you're sick and tired of cleaning, setting and replacing spark plugs—you'll order a set of SA FIRE INJECTORS today!

J. C. WHITNEY & CO.
1917 (P22) Archer Ave., Chicago, Ill. 60616

J. C. WHITNEY & CO.
1917 (P22) Archer Ave., Chicago, Ill. 60616
Yes, I want new pep, power and performance.

☐ I enclose check or money order to cover payment in full. You pay postage.

☐ Send C.O.D. I enclose 25% deposit and will pay postmen balance plus postage and C.O.D. charges upon delivery. My car or truck is:

Make	Year	Model

No. of Cyl.____ Cu. In. Disp. or Eng. Model ____

Check set desired:

☐ No. 704—Set of 4 Fire Injectors . . . . . $ 5.98
☐ No. 705—Set of 6 Fire Injectors . . . . . $ 8.94
☐ No. 706—Set of 8 Fire Injectors $11.92

NAME____

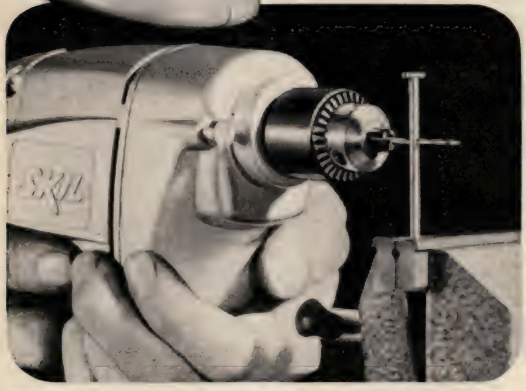
ADDRESS____

CITY____ STATE____ ZIP CODE____

Do not send currency or stamps.

The green trigger identifies the greatest advance in electric drills in 50 years!

Exclusive! New! Skil



HOLE IN NAIL DEMONSTRATES THE AMAZING CONTROL OF NEW SKIL DRILL. We did it with the ¼" Skil Trigger Speed Control (TSC) Drill. TSC drills also available in ⅜" and ½" sizes.

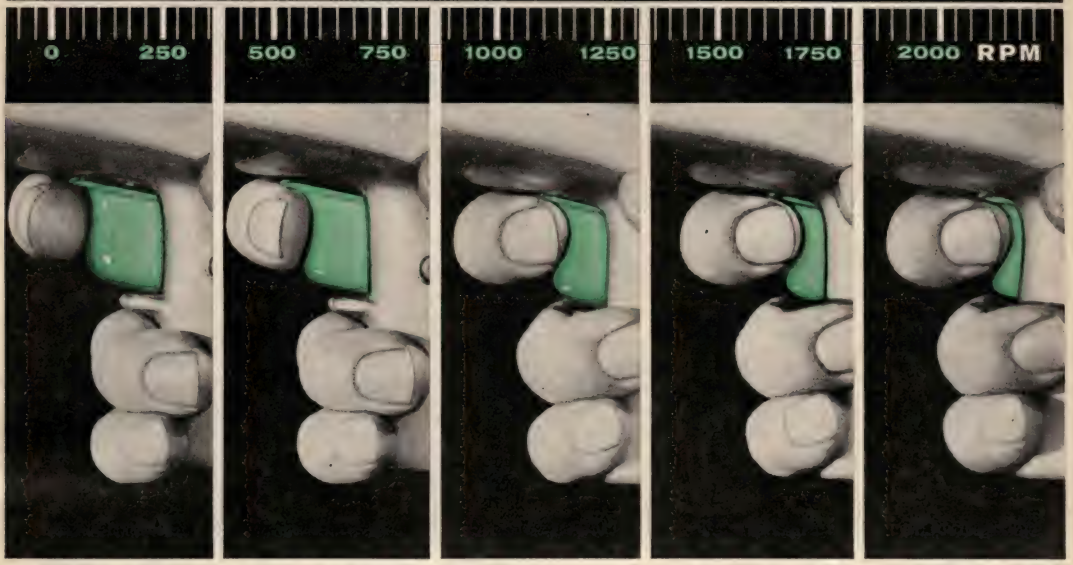
A PRECISION DRIVER, TOO! With the versatile Skil Trigger Speed Control Drill the variable speed feature lets you start screw at low speed, run it down at high speed, set it by slowing to a stop.

Go with the pick of the pros... **SKIL POWER TOOLS**

Skil Corporation, 5033 Elston Ave., Chicago, Illinois 60630

SQUEEZE THE DRILL SPEED YOU NEED

With Trigger Speed Control you actually sense the correct speed with your trigger finger—much as you sense your car's speed with your foot on the accelerator.



Trigger Speed Control Drill

For the first time, you regulate speeds, from 0 to 2,000 rpm's, with your trigger finger

TO MATCH THE MATERIAL

You get stepless speed control to drill plastics, composition materials, wood or metal by varying finger pressure. No buttons or dials to fool with.

TO DRILL HOLES IN METAL WITHOUT CENTER PUNCHING

Start with light trigger pressure which keeps rpm low, makes bit placing easy—even on convex surfaces.

TO DRIVE SCREWS TO EXACT DEPTH

Exchange drill bit for driver bit, drive screws to exact depth you want. Even drive self-tapping metal screws—without center punching.

SEE NEW SKIL TSC DRILLS AT BETTER DEPARTMENT, HARDWARE AND LUMBER STORES EVERYWHERE

AUTOMOTIVE

RADIO-TV

MAINTENANCE

WORKSHOP

New on the Market

Gives Water Pressure a Boost

You can raise your house water pressure by as much as 20 lbs. with the Home Booster Pump. Connected to your plumbing, it turns on automatically in response to any heavy demand for water. Costs $80. Sears, 925 S. Homan Ave., Chicago, Ill.

Flush Valve Installs Easily

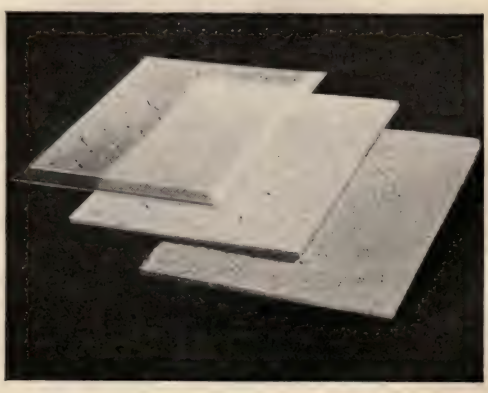
A new toilet-tank valve assembly, called Miracle Valve, can be installed quickly without the use of tools. The stainless steel valve seat is placed over the existing seat, and is held in place by a clamp that fits around the overflow pipe. A rubber ball valve fits the new seat snugly to give a tight seal. Since it's hinged to the seat, it can't be jostled out of position. A Dacron string is used to connect the ball to the trip-lever arm. Guaranteed for the life of the toilet, it's $3 from Pacer Products Co., P.O. Box 582, Moberly, Mo.

Fix Concrete Floors in a Jiffy

Jiffy Floor is an instant-setting granulated plastic compound for repairing cracks in concrete floors. After cleaning out the crack you apply a special primer, then pour in the Jiffy Floor compound. To set the material, you tamp it or run over it with a wide-wheeled hand truck. According to the manufacturer, the repaired floor can be used immediately. Prices, including primer, run from about $3.70 to $5 per gal., depending on the quantity ordered. Manufactured by The Monroe Company, Incorporated, 10703 Quebec Ave., Cleveland, Ohio 44106.

New Look for Grid Ceilings

Two unusual panels now increase the flexibility of grid-ceiling treatments. One, shown in top of photo at right, is translucent, and is installed under light fixtures. With light off, it closely resembles the manufacturer's Cotillion panel (center of photo). With light on, it becomes luminous. Cost is $2 in 2x2-ft. size, $4 in 2x4 size. The other new panel, called Woodstran, is made of compressed wood fibers that create a swirled texture. Costs $1.15 in 2x2, $2.30 in 2x4. National Gypsum, Gold Bond Bldg., Delaware Ave., Buffalo, N.Y.



Special Invitation to Inventors

If you have an invention or an idea for an invention, whether patented or unpatented, that you wish to sell outright or on a royalty basis, the booklet we offer free in the coupon below may be very valuable in saving you both time and money.

We are specialists in representing inventors and submitting their inventions and ideas to manufacturers. We work continuously with scores of manufacturers seeking new products, and we have connections from coast to coast and in foreign countries. We are well informed which manufacturers may be especially interested in your particular kind of invention. Hundreds of these manufacturers have written us descriptions of the types of inventions they want.

Our service is designed to do all the many things the average inventor does not have the time or facilities for doing, or who lacks knowledge of the proper markets. When you appoint us to represent you, we prepare sales material that points up your invention, its advantages, its construction, its market potential and profit possibilities.

For presenting your invention to selected manufacturers we charge a modest fee (which is refunded if we handle the sale of the invention for you) and the customary commission. We are a Nationally known concern, with an impeccable reputation for ethics and integrity. We believe ours is the finest service offered inventors.

We are not patent attorneys. However, if you have need for a patent attorney and do not know one, write us and we will tell you how to obtain the names of all U. S. Patent Attorneys in your area, and you can make your own choice.

To encourage inventors, whether their inventions are patented or unpatented we have prepared a booklet entitled "How to Go About Selling Your Invention." This booklet contains such information as current royalty rates being paid by manufacturers, discusses various types of inventions and the markets for them, and tells the most effective methods you can use in presenting your invention for sale, whether you employ us or do it yourself.

You can obtain a copy of this booklet merely by mailing the coupon below. It will be sent to you with our compliments, free, without any obligation whatever. If you wish to write us for comments about your invention, please do so. We make no charge for consultation. But please do NOT send blueprints or models. Just describe your invention briefly, its nature and purpose.

REFERENCES: Your own bank, attorney, or Chamber of Commerce.

K. O. Kessler, *President*
KESSLER SALES CORPORATION
Accredited as a Corporation
Under the Laws of Ohio
FREMONT, OHIO

MAIL THIS COUPON FOR FREE BOOKLET

Mr. K. O. Kessler, *President*
Kessler Sales Corporation, Dept. D-52, Fremont, Ohio

Please mail me a copy of your FREE Booklet, "How to Go About Selling Your Invention," which reveals many points about selling inventions and explains your service. It is understood that there is no charge for this booklet now or at any other time and I am not obligated in any way.

MY NAME.....

STREET ADDRESS.....

CITY.....STATE.....ZIP CODE.....

Add $1200 a Year to your RETIREMENT INCOME!

FREE PLAN TELLS YOU HOW

You can have your own lifetime business right at home . . . work in spare time . . . and make up to $200 a month CASH! My FREE PLAN gives you all the facts: How to start, how to grow. You don't have to sell. I'll even finance you. People bring you the work and pay cash. Over 90c of every dollar you collect is clear cash profit. And you work when you want to. Let me prove you can't find a more certain, lower cost, higher paying business of your own.

Just Mail Coupon—No Salesman Will Call — FREE BOOK

BELSAW SHARP-ALL CO., Stan Field, President
715 H Field Bldg., Kansas City, Mo., 64111

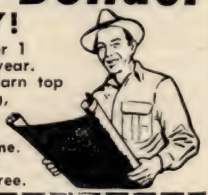
Name_____

Address_____

City_____ State_____

Be a Home Builder

EARN BIG MONEY!



Get into Building Construction. Over 1 million new homes are built each year. Billions are spent on remodeling. Earn top pay as a craftsman; or in estimating, purchasing, blueprint reading, supervising. Learn every phase of contracting. **Train at home in spare time.** Earn cash as you learn. **Mail coupon for new opportunity booklet. It's free.**

COMMERCIAL TRADES INSTITUTE, Dept. C-190
1400 GREENLEAF AVE. • CHICAGO 26, ILL.

NAME_____ AGE____

ADDRESS_____

CITY_____ ZONE____ STATE____

Accredited Member National Home Study Council

Easier, Faster Way to a HIGH SCHOOL DIPLOMA

Free Booklet tells all about Britannica Academy's new way to finish high school quickly —at home in your spare time!

Using the "Automated Learning" system, you zip through high school courses. You become a High School Graduate much faster than you ever dreamed possible! Don't be held back from better pay, Civil Service, best jobs. Mail postcard for FREE "Diploma-Success" Booklet. (Tells you how much credit you get for high school work already done.) No obligation.

Britannica Academy, P.O. Box 6739, Dept. 246, Chicago, Illinois 60680

PROFIT IN YOUR SPARE TIME

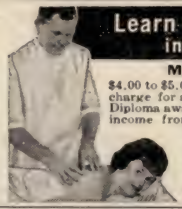
SMALL ENGINE REPAIR PAYS BIG!
Outboard · Powermower · Chain Saw · Tractor
MAKE EXTRA MONEY — or fix your own engines and SAVE! Illustrated, easy-to-learn Home Study Course qualifies you as expert. Free information. Write today!

LINCOLN TECHNICAL INSTITUTE
SUITE 2E 472 MARKET STREET, NEWARK 5, N. J.

FREE OUTFIT STARTS YOU IN BIG MONEY SHOE BUSINESS!

Run your own profitable 'shoe store' business *from home* in spare or full time. We give you—***FREE***—complete Starting Outfit that makes you ***$217.00 EXTRA each month for just 2 easy orders a day.*** You feature 275 fast-selling dress, sport, work shoe styles for men and women. Air-cushion shoes, many other special features! Sizes 2½ to 16—widths AAAA to EEEE. Draw on 300,000 pair stock. Your own shoes FREE. Discounts to your family. Prizes, bonuses—even a new car—at no cost to you. Rush postcard for your FREE Starting Outfit today... Now!

MASON SHOE, Dept. F-748, CHIPPEWA FALLS, WIS.



Learn Profitable Profession in few months at Home

MEN AND WOMEN, 18 TO 60

$4.00 to $5.00 for 1-hour treatment is the established charge for a skilled operator. Easy to learn and do. Diploma awarded. Open your own office or earn good income from Doctors, Hospitals, Clubs and other health or recreational centers. Wonderful part-time profession. Low monthly payments. Write today for free Anatomy Charts and catalog. No obligation.

ANDERSON SCHOOL OF SCIENTIFIC MASSAGE
Dept. B-1, Princeton, Illinois

MONEY IN WORMS

Success for you! 5000 of our hybrid red wiggler fishworms produce 5,000,000 in one year using our successful method of worm raising. Read our success story in LIFE MAGAZINE, Dec. 28, 1959 issue. Let us teach you our secrets of success. Write today for FREE INFORMATION on how to raise and sell fishworms and crickets.

Special Today—Hybrid Red Wigglers—3000—$5.95, 5000—$8.95, 10,000—$16.95. Postpaid.

CARTER WORM RANCH, PLAINS, GEORGIA

UNITED STATES HISTORICAL STAMP COLLECTION Only 10c

Includes 1893 Columbian plus 19 different commems. plus U.S. Mint and USED stamps included on approval. Send 10¢.

K & B STAMP CO., Dept. "M," Box 70, Brooklyn 23, New York

INSTALL BURGLAR ALARM SYSTEMS... BIG PROFIT HOME BUSINESS

PROFITS!
Protect men's shop
Gross Profit $188
Protect Flooring Co.
Gross Profit $411
The burglar alarm service profits need more explanation. 100 clients pay $6,000 to $12,000 a yr. Get details.

Start spare time. No mechanical experience or costly equipment. Expert shows beginners way to big profits installing in stores, homes. Big demand. Write for FREE PLAN now.

NASCO, 11071 Massachusetts, Dept. P252, Los Angeles 25, Calif.

LAW FREE BOOK — THE LAW TRAINED MAN

Write today for a FREE copy of illustrated law book, "**THE LAW-TRAINED MAN,**" which shows how to earn the professional Bachelor of Laws (LL.B.) degree through home study of the famous Blackstone Law Course. All necessary books and lessons provided. Moderate cost; convenient monthly terms. Write for FREE law training book today.

Blackstone School of Law, 307 N. Michigan Ave.
Founded 1890 **Dept. 52, Chicago 1, Illinois**

Announcing World-Famous NATIONAL RADIO INSTITUTE'S

Completely New Training-at-Home

for the man who wants to SAVE MONEY and MAKE MONEY
—spare time or full time—cashing in on the demand for men who know how to

SERVICE ELECTRIC APPLIANCES

NRI's 50th Anniversary Brings You This Opportunity of a Lifetime To Become a Master Appliance Technician . . . Save on YOUR OWN Home, Shop or Farm Repairs . . . Make $3 to $5 an Hour Fixing and Servicing Appliances for Your Neighbors!

FOR 50 years, NRI has been successfully training men like you to become top-notch Technicians. Now NRI training is bigger and better than ever — YOU gain bigger and better profits from it!

NRI's *new*, completely revised and *expanded* home-training course offers you EVERYTHING YOU NEED TO KNOW—whether you want to fix your own appliances to *save* money, or *make* money.

Easier Than You Think!

You DON'T need technical experience. You DON'T need higher education. Everything is *explained* in plain English — *shown* in big, detailed, clear pictures. You start from scratch — learn how electricity works — then rapidly advance to installing new outlets, rewiring, fixing and servicing every kind of home, farm and business appliance.

NRI's special new section on modern air conditioning and refrigeration gives you complete know-how in this fast-growing field. Other sections are invaluable for men who work on farms, or in stores or plants. No matter what you're called on to fix, in no time you'll be making repairs like a pro. And — you now get special bonus lessons on 2- and 4-cycle gasoline engines!

Make Extra Money

More than a MILLION appliances and engine-powered tools are sold *each week!* Once you can fix them, you'll "cash in" on this boom. It's a fact: NRI-trained men earn $3.00 to $5.00 an hour *in spare time alone!*

Don't worry how little you may *now* know about repair work. Former student John D. Pettis, who works out of his basement, says: "I had practically no knowledge of any kind of repair work. Now I am busy almost all my spare time and my day off — and have more and more repair work coming in all along."

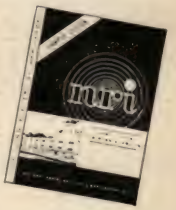
No matter where you live, everyone owns and *depends on* appliances. And once you know how to service them, the owners depend on YOU!

MAIL COUPON TODAY

Wouldn't you like *right now* to be able to repair your own broken appliances? Wouldn't you like *right now* to have money coming in each week? Let NRI show you how. Free Book and Free Sample Lesson describe the new, expanded, low-cost NRI Course in full . . . show how you can quickly master repairing appliances in your spare time. Mail coupon TODAY (or write direct to) *National Radio Institute, Dept. 600-025 Washington, D.C. 20016.* (No obligation, of course — and no salesman will call on you.)

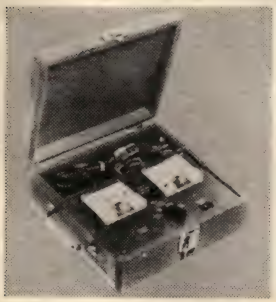
This FREE BOOK

will open your eyes to a whole world of new opportunities for making money, saving money, through time-tested, low-cost NRI training.



This FREE LESSON

will show how simple and clearly illustrated NRI training is — how it can quickly prepare you to be an *expert* Service Technician in your community!



Earn While You Learn with this Professional APPLIANCE TESTER KIT — *Yours at No Extra Charge!*

FIX ALL THESE — AND MORE!

- Travel Irons
- Steam Irons
- Lighting Fixtures
- Fluorescent Lights
- Switches
- Heaters
- Fuses
- Plugs
- Lamps
- Electric Blankets
- Toasters
- Coffeemakers
- Chafing Dishes
- Automotive Air Conditioners
- Water Heaters
- Centrifugal Pumps
- Egg Cookers
- Bottle Warmers
- Vaporizers
- Paint Sprayers
- Waffle Irons
- Roasters
- Deep Fryers
- Electric Shavers
- Clocks
- Food Mixers and Blenders
- Tank Vacuum Cleaners
- Canister Vacuum Cleaners
- Upright Vacuum Cleaners
- AC Motors
- Non-automatic Washers
- Automatic Washers
- Refrigerators
- Freezers
- Vegetable Coolers
- Soda Fountain Coolers
- Bench Grinders
- Two-cycle Gasoline Engines
- Four-cycle Gasoline Engines

MAIL NOW FOR FREE BOOK AND SAMPLE LESSON

Mr. J. M. Smith, President
NATIONAL RADIO INSTITUTE
Appliance Servicing Division
Dept. 600-025, Washington, D.C. 20016

Please send Free Book and Free Sample Lesson. I am particularly interested in:

☐ Business of my Own ☐ Spare-Time Earnings
☐ Repairing My Own Appliances

No salesman will call

Name.....
(Please Print)

Address.....

City.....Zone....State.....

Accredited Member National Home Study Council

DETROIT LISTENING POST

Front drive for Olds and possibly Riviera; Variable rate steering for Pontiac, Cadillac?

The latest rumble from the **General Motors** mechanical kitchen is that front-wheel-drive systems still are boiling on the front burner. **GM** division chiefs continue to refuse comment, but **Olds** now is definitely in the swim for the '66 model year. **Pontiac's** chiefs have definitely rejected the idea, but **Buick** is still considering it—with an eye toward changing the **Riviera** for 1967.

Pontiac is giving the eye to another possibility—the "car-of-tomorrow" power steering system from **Bendix** that *PM* reported on last August. This variable-ratio system is tailored so response is fast when you're making a sharp corner; at full lock the ratio is less than 6:1. At highway speeds, where turning is much more gradual, this would present near fatal tendencies for over control. So when you're pointed dead ahead, the ratio available is closer to what we think of as normal (actually 17:1, most power units today are in the low 20s).

That means you turn the steering wheel 17 degrees for a one-degree pivot of the front wheels. But by the time you've pulled the wheel to full lock, it takes less than 6 degrees at the steering wheel for a degree at the front wheels.

The new **Jaguar 4.2** is the first production car to offer the **Bendix** Varamatic system, and **Pontiac** may be the first domestic car. **Cadillac,** too, is studying variable ratio, but is more interested so far in a similar system from **Saginaw Steering,** a fellow **GM** division. **Saginaw's** system is also developed to the point of being ready for mass production—as soon as the decision makers decide it'll sell.

Variable ratio doesn't require much additional gear under the hood, but there is still a cost penalty. It depends on a worm gear with a pitch that changes from one to the other. Special tooling is required. The odds are that for a few years it'll be an extra-cost option. Then when tooling is largely paid for it'll become standard equipment.

In Dearborn, **Ford** has dropped—at least for now—plans for an independent rear suspension on the **Mustang.** Two **Mustangs,** after all, won the Tour de France competition with live rear axles. Performance like that won't convince the accountants that a costly independent rear is needed. And **Mustang** as it stands is selling like ice cream on the Fourth.

Instead, minor suspension changes will help **Mustangs** take full advantage of the control properties of radial tires planned for next fall.

A Michigan reader asks us whether engineers have ever considered driving airconditioners with electric motors instead of from the car's engine. He suggests that during the off season there'd be less wear on the airconditioner—it would simply be turned off.

It's an appealing idea: Why run those wheels and pulleys in the winter? But an automotive air conditioner actually requires 3 to 5 hp. That works out to about 4200 watts of power—350 amps at 12 volts.

Car batteries, so far, are a long way from that capacity.

Know why you so rarely see cashew nuts in their shells? A resinous oil from the thin inner shell is valuable—as a binder in making brake linings. So cashews are sold after they've been undressed. Besides, the oil gives many people a dermatitis similar to poison ivy or poison oak, hardly the sort of thing to sprinkle on your vanilla sundae.

The **3M Company,** which says it's the world's largest importer of raw cashew nut shell liquid, says the oil can also be used as an immunizer against poison ivy, poison sumac, and the like. But your exposure would have to be very carefully controlled.

It could happen before you read this—imported-car authorities are talking of reports that the **MG-B** will have, for '65, a new V4 engine. Designers at **MG** are inventive and imaginative enough to do it, but why would they? Engine life might improve some, but a big gain would be in under-the-hood space. And today's straight Four isn't particularly crowded.

Automotive Editor

For a power boost look for AC's four green ribs when you buy!

Next time you buy spark plugs, insist upon those with four green ribs. This is a quick way to identify AC Fire-Ring Spark Plugs with the exclusive Self-Cleaning Hot Tip Insulator. The AC Hot Tip stays clean to help you get better performance, better gas mileage from your car. ACs are sold only under the AC name and are made in only one quality . . . the best. That's why you buy with confidence when you buy ACs.

AC

FIRE-RING SPARK PLUGS

AC SPARK PLUG THE ELECTRONICS DIVISION OF GENERAL MOTORS

Now! A clear, simple way to teach yourself

ELECTRONICS

At last there's a simple, surefire way for you to learn basic electronics at home, in your spare time. That way is ELECTRO * STUDY—a new, step-by-step self-teaching method that brings electronics within the grasp of everyone, regardless of experience or education.

Each ELECTRO * STUDY unit consists of a simply written, profusely illustrated textbook . . . and a programed Study Guide, with hundreds of questions and answers on material in the text. As you read the text, you review important points by referring to the Study Guide, so you remember them better. This frame-by-frame method makes tough points seem easy. You really learn your stuff!

Here are the 16 ELECTRO * STUDY units, each covering a vital area of basic electronics knowledge:

E1 Electrons at Work
E2 Electric Circuits and Ohm's Law
E3 Magnetism, Electromagnetism—Wiring, Soldering
E4 Theory of Alternating Currents
E5 Direct-Current Networks
E6 Inductance and Capacitance
E7 Transformers in Radio and Electronics
E8 Motors and Generators in Electronics
E9 Resonant Circuits
E10 Radio Communications Fundamentals
E11 Vacuum Tube Fundamentals
E12 Batteries and Electronic Power Supplies
E13 Audio Frequency Amplifiers
E14 R-F Circuits
E15 Transistors and Their Applications
E16 Superheterodyne Receivers

Order as many of these units as you want—but order now! Take advantage of the special introductory price of just $4.95 each. Charter subscribers will receive, FREE, a handsome vinyl case for each Study Guide.

DON'T DELAY. FILL OUT THE COUPON NOW!

INTERNATIONAL EDUCATIONAL SERVICES
Box 823, Scranton, Penna. 18515

☐ Send me, postpaid, the ELECTRO * STUDY units circled below, at $4.95 each. I enclose check (money order) for_____to cover full amount.

☐ Send me circled units COD. I will pay postage.

15-day money-back guarantee, either way.

E1 E2 E3 E4 E5 E6 E7 E8
E9 E10 E11 E12 E13 E14 E15 E16

Name_____

Address_____

City_____

State_____Zip Code_____

75 POWER TELESCOPE 25X-45X-75X $3.98

NEW 3 in one telescopes, 3 variable 25X 45X-75X magnification. Brass bound. 25 power for ultra bright images 45 & 75 power for long range. Guaranteed to bring distant stars, moons, objects, sports 75 times closer. Most powerful scope sold anywhere near this amazing low price. American made, 5 sections. Opens 36", closes 1 ft.; contains 4 ground & polished lenses. Can also be used as powerful compound microscope. Mass production enables us to offer telescope complete at $3.98 postpaid. Money back guarantee.
CRITERION CO., Dept. PBM-24, 331 Church St., Hartford, Conn.

NSU PRINZ
and SPORT

EVERYBODY IN EUROPE knows or drives an NSU PRINZ! MANY also in AMERICA!
Choice models, including SPORT by Bertone. Service and Parts nationally. Contact Exclusive IMPORTER, Transcontinental Motors, 421 East 91 St., New York 28, N. Y. (212) TR 6-7013.

TRANSEAL

STOPS LEAKS IN AUTOMATIC TRANSMISSIONS

at Service Stations, Auto and Hardware Stores

At Last a New Amazingly Simple
GAS TURBINE
JET ENGINE

Build from easy to follow plans. Length 15", Dia. 8½", Wt. 15 lbs. Fuel: Gasoline or Kero.
"Screamin Demon" develops 20 H.P. Ideal project for serious-minded hobbyists, students; scientific and industrial arts classes. Make on 9" metal cutting lathe with milling attachment. For use on small racing boats, midget cars, etc. Full size assembly drawings with critical dimensions, bill of materials and photos. **Price $5.00. No C.O.D.**
SAVOY SCIENTIFIC, BOX 1398, SANTA MONICA, CALIFORNIA

AUTOMATIC 100-SHOT PELLET STINGER 1.98

Dogs, Other Animals, Assailants Instantly Repulsed. The pellet is harmless but STINGS. Holds and fires 100 pellets automatically as fast as you can pull the trigger to knock most stubborn assailants off guard. Portable, fits easily in pocket or purse. Made of high impact styrene for long life, trouble-free use. Fully guaranteed. Keeps dogs and animal pests off your property. A great training aid. More humane to animals than kicking or hitting. Send **$1.98** cash, check or money order plus 27¢ to cover handling and we include 50 stinging pellets. Not sold in N.Y.C. or if under 16 (State age with order).
(100 pellets $1) (250 pellets $2) (1000 pellets $5)
Standard American Gun, Dept. 2-PMS, 1 Park Ave., N. Y. 16, N. Y.

CONCRETE BLOCK HOME PLANS

$2600 RANCH HOME

Build your own 24'x40' Vacation-Retirement Home complete for $2600. Contains Liv. Room, Kit., two bedrooms, bath, fireplace, slab or basement, carport or garage. Easy to follow blueprints, instructions and material cost list $5.00 ppd. Money back guarantee. Other plans—Cottages, Ranch Homes, Cape Cod, Split Level, Patio Westerner, Garage Apt., Duplex, Garden Apt. Color Catalog with illustrated section "How To Build Your Own Block Home," 25c.
QUALITY PLANS SINCE 1953
BAILEY BUILDERS, 7213-D Missouri Ave., Little Rock, Arkansas

Or Your Money Back Guaranteed

SURPRISE FRIENDS, RELATIVES. ENJOY POPULARITY AND FUN GALORE!
You get TOP GUITARIST ED SALE'S famous 66 page, secret system worth $3.00 which positively teaches you to play a beautiful song the first day and any song by ear or note in seven days! Contains 52 photos, 87 finger placing charts, etc., plus 110 popular and western songs, words and music; a $1.00 Chord Finder of all the chords used in popular music; a $3.00 Guitarist Book of Knowledge—**TOTAL VALUE $7.00—ALL THREE for only $2.98.** SEND NO MONEY! On delivery, pay postman $2.98 plus C.O.D. postage. Or send $3.00 with order and I pay postage. (Sorry, no C.O.D. outside Continental U.S.A.—please remit with order). Money-back Guarantee. **ED SALE, Studio 153-D, AVON BY THE SEA, N. J.**

WE WILL PAY $5 FOR ANY 1955 HALF DOLLAR

2,876,381 issued • Check your change right now . . . you may have one of them • This recent Half Dollar is only one of hundreds of coins we are searching for throughout the nation • Remember, many coins less than 20 years old are extremely valuable • **"Brownlee's 1965 Green Book of Rare Coins"** our latest illustrated catalog, lists all American coins and shows what we will pay for them • Write for it now—today—and you may be on the way to fun and fortune. **This new, indispensable book costs only $1.00, postpaid.**

BIG STATE COIN CO., (Dept.M) • 1416 COMMERCE ST. • DALLAS, TEXAS

Enclosed $_____ for ____ copies of "Brownlee's Green Book of Rare Coins" $1 per copy, P.P.

Name_____ Street_____

City_____ State_____

Check ☐ M.O. ☐ Cash ☐ *Satisfaction Guaranteed*

THE MARACAIBO

Look to Aluma Craft for the last word in '65 runabouts! They're way ahead—with more style, comfort and convenience than ever—and exclusive construction detail makes them the unquestioned leader, as always, in stability, easy handling and maneuverability. Available in lengths from 14 to 18 feet for cruising, skiing, or fishing. Nine year guarantee.

Illustrated: The New 1500 Maracaibo sports runabout. Large family cockpit area; generous storage. New folding snack table, too!

Free Color Catalog

LOOK TO ALUMA CRAFT FOR '65 RUNABOUTS...

ALUMA Craft

ALPEX

ALUMA CRAFT BOAT DIVISION, ALPEX CORPORATION

1519 Central Avenue • Minneapolis, Minnesota 55413

"Took in $9000 Last Year in Sparetime"... A.I.

Work Out of Your Own Home!

Here's ideal way to start in business for yourself without a big investment. You don't even need a shop or office. Work out of your own home, use your present car. You do business in other people's homes. And you can start in sparetime—and graduate to full time.

No Experience Needed! We Start You!

Foley-Care equipment is foolproof. It works for you. No need to have weeks of training. We don't charge you a dime for helping you get started.

Foley CARE

Free Booklet Tells You How

Send for this free "Business of Your Own" booklet! See for yourself why this might be the chance you've always wanted to be in business for yourself. It tells the complete story about this profitable service business—lets you decide for yourself. Write today! No salesman will call.

FOLEY CARE, Dept. 202-5
3333 Fifth St. N.E., Minneapolis, Minn. 55418

☐ Please send booklet on how to start a rug cleaning service.

Name_____

Address_____

City, State, Zip code_____

CLINIC FOR HOMEOWNERS

Q My front door has no protection. It's an older type door and I've noticed that it's beginning to pull apart at the joints and the paint is peeling at these points. I've cleaned and repainted it once, but now the paint is peeling again. There are a few small paint blisters at other points. What's the probable cause and remedy?—W.S., Ky.

A When you say "no protection" we assume you mean there is no storm door or canopy. If this assumption is correct, then there are two probable causes, 1) water, from driving rains is working into joints between stiles and rails and being absorbed. This causes paint to peel about the joints, particularly lower ones. 2) Moisture condensation on the room side of the door may also be a cause, or at least a contributing cause. Moisture in the form of water vapor, seeking the colder, drier air outside, can force its way into the joints, causing the wood to swell and then shrink, resulting in paint peeling from the adjacent areas. A tight-fitting storm door will help to prevent further deterioration as it will shield the inner door during the colder months. It will also tend to equalize the temperature at the outer surface of the inner door, largely preventing absorption of condensate.

Q I'm thinking of renting a floor sanding machine to renew my old hardwood floors. The varnish, or whatever is on the floors, is in bad shape and may be difficult to sand off. I'm told that if I use turpentine, it will prevent clogging of the sandpaper and make the finish easier to remove. Is this true?—K.H., Mo.

A The question of using a solvent when machine-sanding a floor has been discussed before in this column. For obvious reasons we cannot recommend the use of a solvent, either flammable or nonflammable, as an aid in floor sanding. Using a flammable solvent, such as turpentine, there is an ever-present fire hazard should the abrasive on the machine drum strike an exposed nail head, tack, or other metallic object. In using any solvent for such work, there is not only a possible

fire hazard, but a health hazard as well, due to the fumes released from most volatile solvents. Generally it is best to use a coarse open-coated abrasive on the machine for the first time over an old floor. By guiding the machine at an angle with the floor boards where possible, you will have less trouble with clogging of the abrasive, as the latter will cut faster when run at an angle with the grain of the wood. In some cases it may be necessary to make two passes with the coarse abrasive, running at an opposite angle about equivalent to that of the first pass, in order to remove all the old finish down to bare wood. Once you have all the old finish off, change to a finer abrasive and sand with the grain.

Q I'm planning construction of a home with brick outer walls, cinder block backing and plaster directly on the blocks. But my contractor says such a wall will sweat, that moisture will form on the plastered walls and cause trouble. He wants to furr the walls, insulate and install plasterboard over the insulation on all outside walls, so he says. It's more expensive. Is he right?—O.N., Ga.

A He is right. Building an all-masonry wall and plastering the room side without furring and insulating with a vapor barrier is inviting trouble with moisture condensation on the room side of the outside walls of a home, more especially if the structure is built where the temperature falls below freezing and remains so for any length of time. Such walls tend to become colder than the air with which the surface on the room side is in contact. Condensate forms on the cold surface, resulting in "sweating." We suggest you follow his advice.

Q I want to make a filler for plaster cracks colored to match the paint I put on the wall. So far I've not been able to find a crack filler to match, but a matching filler is what I want. Can you tell me what materials to use, how to mix, and so on?—A.H., Fla.

A You can mix a small quantity of the paint you are going to apply to the wall with sufficient whiting to make an easy working paste. Nearly all interior wall paints can be mixed with whiting in this fashion. However, if your purpose in this is to prevent crack fillers from showing through succeeding coats of paint you may be disappointed. Try "sizing" the patches with a coat of paint and allowing to dry before final applications of paint.

Now! It's easy to have Bruce Oak Floors

PREFINISHED . . . just lay over subfloor or old floor

Now you can give your living room, bedrooms or added-on room the lasting beauty and style of famous Bruce Floors. This highest quality Oak flooring, completely finished at the factory, can be laid over new subfloor or old floor. Bruce Blocks are installed in adhesive (see above). Ranch Plank with pegs and Strip floors are blind nailed. No sanding or finishing.

ECONOMICAL! A new Bruce Oak Floor will cost you less than a good rug . . . and will last the life of your home. The beautiful Tuf-Lustre Prefinish doesn't chip or mar, and is so easy to care for. Mail coupon below for booklet in color.

MAIL FOR FREE FLOOR BOOKLET

E. L. Bruce Co.
1620 Thomas Street
Memphis, Tenn.—38101

Send information on Bruce Prefinished Oak Floors to:

Name_____

Address_____

BRUCE Prefinished Oak Floors

HOW TO

Use This EASY, Use to Fix Practically Quickly, Easily, RIGHT--

Now—Whether You're a Beginner or an Expert Mechanic—You can "Breeze Through" Almost ANY Repair Job on A Popular-Make Car—1958 thru 1965!

SUPPOSE you had an automobile factory engineer standing right beside you — guiding your hands through every step of even the toughest repair job! Think how you'd "whiz through" every job! No wonder, then, that OVER 5 MILLION copies of Motor's famous Auto Repair Manual have been sold!

No guesswork! Motor starts from scratch — tells you what tools to use, then *shows* you, in step-by-step words and pictures, how to fix practically ANY part of ANY car listed here — 1958 thru 1965!

SEND NO MONEY
Try Book For 10 Days
FREE

OVER 5 MILLION COPIES SOLD!

1,325 BIG PAGES
3,800 PICTURES!

Over 1,300 pages. 3,800 "This-Is-How" pictures. 457

COVERS THESE MAKES — 1958 THRU 1965 — PLUS NEW SECTION ON VOLKSWAGEN

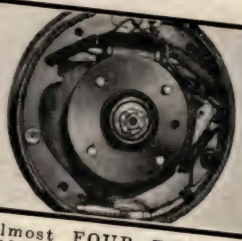
American	Comet	Falcon	Oldsmobile
Barracuda	Continental	Ford	Olds F-85
Buick	Corvair	Imperial	Plymouth
Buick Special	Corvette	Jeep	Pontiac
Cadillac	Dart	Lancer	Rambler
Chevelle	De Soto	Lincoln	Studebaker
Chevrolet	Dodge	Mercury	Tempest
Chevy II	Edsel	Meteor	Thunderbird
Chrysler	Fairlane	Mustang	Valiant

CLEARS UP 'MYSTERIES'. "I always rely on Motor when I do a repair I am not familiar with. Well illustrated, complete, simple."
—E. Jones, Minnesota (Shop Owner)

GREAT HELP FOR STUDENT. "Motor pulled me out of some rough spots in high school and even now. At present, I'm in the Armed Forces, attached to the motor pool."
—W. Bekemerer, Missouri (Apprentice)

FIX CARS FAST!

Step-by-Step Guide the "Pros" ANY Part of 2,341 Car Models -- Even the First Time You Try!



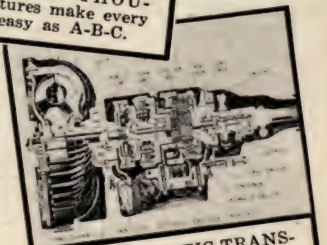
Almost FOUR THOUSAND pictures make every operation easy as A-B-C.

"Quick-Check" charts. 55,000 Essential repair specs. Over 225,000 service and repair facts. PLUS, *for the first time*, a big new section on Volkswagen! PLUS the giant TROUBLE SHOOTER section that helps you pinpoint the cause of any of 2,300 car troubles in a jiffy!

THE "MEAT" OF 300 OFFICIAL SHOP MANUALS

Engineers from each auto plant worked out these time-saving procedures for their own cars. Now the editors of Motor have gathered, boiled down, and simplified this wealth of know-how in one giant volume!

Even a green beginner mechanic can do a good job with this giant manual before him! And if you're a top-notch mechanic, you'll highly value the time- and work-cutting procedures you'll find. No wonder this guide is used by the U.S. Army and Navy! No wonder hundreds of thousands of repairmen, instructors and students call it the "Auto Repair Man's Bible"!



ALL AUTOMATIC TRANSMISSIONS fully covered in special big section.

USE BOOK 10 DAYS AT OUR RISK

We'll send this giant Manual to your home or shop, so you can see for yourself how great it is. If it doesn't pay for itself in the first 10 days, return it and owe nothing. Mail coupon at once to: MOTOR Book Dept., 250 W. 55th St., New York, New York 10019 *(SCHOOLS BOOKSTORES: write for discounts)*

You get illustrated adjustment procedures for *all* carburetors and fuel systems.

Same FREE 10-Day Trial on MOTOR'S New TRUCK REPAIR MANUAL

Covers all gasoline engines, plus Ford, GM, Cummins, Mack, Perkins, International diesels since 1955. Over 2,000 illustrations! Check box in coupon for FREE TRIAL offer.

MAIL COUPON NOW FOR 10-DAY FREE TRIAL
(Attach to Postcard if More Convenient)

MOTOR BOOK DEPT., Desk 512
250 West 55th Street
New York, N. Y. 10019

☐ Rush to me at once **MOTOR'S New AUTO REPAIR MANUAL.** If O.K., I will remit $2 in 10 days, $3 monthly for 2 months and a final payment of $1.95 (plus delivery charge and sales tax, if any) one month after that. Otherwise I will return the book postpaid in 10 days.

☐ Also send me for 10 days' Free Trial **MOTOR'S New Truck REPAIR MANUAL.** If O.K., I will remit $11, plus delivery charge and sales tax, if any, in 10 days. Otherwise I will return book postpaid in 10 days.

Print Name.....Age.....

Address.....

City.....

State.....Zip Code.....

☐ **Check box and save** delivery charge by enclosing WITH coupon in envelope entire payment of $9.95 for Auto Repair Manual (or $11 for Truck Repair Manual) plus sales tax, if any. Same 10-day return-for-refund privilege.

plus JOHN F. KENNEDY MEMORIAL ISSUE

RUSH REPLY for your new FREE collection of 101 all-different Worldwide stamps. Year's newest issues — pictorials, commemoratives, bi-colors, mint and used. Get Abu Dhabi, Malaysia, Israel, Paraguay — space explorers, Nile monuments, Olympic sports — many more. PLUS colorful older varieties. Supply limited, one to a collector. Rush 10c handling for this valuable collection, approval offers.

GARCELON STAMP CO., Dept.PM-26,Calais, Maine

GARCELON STAMP CO., Dept.PM-26, Calais, Maine
Rush FREE 101 Worldwide Stamps, approvals, other offers. Enclosed 10¢ for handling. (PLEASE PRINT)

.....

.....

.....

High School at Home

MANY FINISH IN 2 YEARS

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H.S. texts supplied. Thousands enroll each year in this 68-year-old school. Send for F R E E descriptive booklet.

AMERICAN SCHOOL, Dept. H245
Drexel at 58th St., Chicago Ill. 60637
Without obligation, please send FREE descriptive booklet.

*Name*_____

*Address*_____

Accredited Member NATIONAL HOME STUDY COUNCIL

NEW WESTERN HAIG

.12 CALIBER

SPECIAL FACTORY OFFER!

$3.00 postpaid

USES POWDER CHARGE

This small bore gun shoots .12 cal. lead bullets fired by small 4.4 mg. powder charge. Not a CO_2 gun! You'll like the handsome lines, grip, and balance. Western in style, but patented ball and cap action allows this low price. 9¾" steel barrel cased in knurled styrene stock, overall 13½". Develop pistol form, accuracy at a fraction of cost of large caliber pistols. Comes with 50 lead bullets. Satisfaction guaranteed. Send $3 to: Haig Mfg. Co., P.O. Box K-4, Alhambra, Calif. 91802

DON'T QUIT SMOKING

... Before Giving My Pipe a Trial!

New principle that contradicts every idea you've ever had about pipe smoking. I guarantee it to smoke cool and mild hour after hour, day after day, without rest without bite, bitterness or sludge. To prove it, I'll let you try a new Carey Pipe. Send name today for my FREE complete trial offer. Write to: **E. A. CAREY, 1920 Sunnyside Ave., Dept. 252-B, Chicago 40, Ill.**

Hotels–Motels Call for Trained Men

Record-breaking travel means nation-wide opportunities and a sound substantial future for trained men in the hotel, motel and hospitality field. Fascinating work; fine living; quick advancement. You can qualify at home or through resident classes in Washington. Previous experience proved unnecessary. Placement Service without extra cost. Write for FREE Book, "Your Golden Opportunity." Accredited member N.H.S.C.

Course Approved for ALL Veteran Training. 49th Year.
LEWIS HOTEL TRAINING SCHOOL, Rm. MB-312, Wash. 37, D.C.

BE A MAGICIAN!

Get started today! Become a popular man of mystery. Earn and learn in spare time. Magic is fun and profitable too. Be the Life of the Party. Astonish your friends!

RUSH **10¢** now for

PROFESSIONAL MAGIC CATALOG

160 pages thick • 800 Illus. • 1000 Mysteries
Also Jokes, Puzzles, Secrets, Illusions.
FREE MAGIC TRICK INCLUDED

HOUSE OF 1000 MYSTERIES DEPT. PM25
4018 N.E. Fifth Ave., Ft. Lauderdale, Fla.

640 ACRES OF WILDLIFE - $20

$20 plus $6.00 taxes yearly gets you a 640 acre wildlife domain near Canadian border. Untamed paradises! (Abandoned timber leaselands.) Extensive choice of these exclusive lakeland campsites, accessible by road, teeming with wildlife, including bear, moose, deer, muskie, northern pike, ducks, geese. Send $1 (refundable) for maps, pictures. Gov't. regulations, official application blank to: Director, O.S.C.A., Room 591, 56 Church, Toronto 1, Canada. Add 50¢ for rush air mail

LAFAYETTE RADIO ELECTRONICS

ALL-TRANSISTOR WALKIE-TALKIE

Ideal for Short-Range Communications

- Great Fun for Kids too—At a Price Even They Can Afford
- Complete with Built-in Antenna, Transmit Crystal, Battery, Plastic Carrying Case • Imported

9.88 each — 2 for 18.88

HA-70 **FREE!** NEW 1965

LAFAYETTE CATALOG NO. 650
OVER 500 Pages

Mail the coupon for your FREE catalog!

LAFAYETTE Radio ELECTRONICS
Dept. LB-5, PO Box 10
Syosset, L. I., N.Y. 11791

☐ Rush my free 1965 Lafayette Catalog
☐ Send me.....HA-70 Walkie-Talkies, shipping charges collect. I am enclosing $.....

Name.....

Address.....

City..... State..... Zip No.....

MOVE UP FASTER—MAKE MORE MONEY WITH N.T.S. "PROJECT METHOD" HOME TRAINING

Just getting started in industry? Being by-passed because you're not up on new industry methods? Don't let technical progress — automation — pass you up. Let an N.T.S. Project Method Home Training program help you **MOVE UP FASTER, MAKE MORE MONEY!**

N.T.S., a leading technical school for over 60 years, **shop-tests every lesson and manual.** Easy-to-follow, fully-illustrated lessons help you learn fast. Look over these big-opportunity home study courses. Choose your field! You'll soon be on your way to a high-paying new career.

ELECTRONICS DIVISION

1. Electronics-TV-Radio Servicing and Communications
2. Master Course in Electronics TV-Radio. Advanced TV and Industrial Electronics
3. FCC License Course
4. Radio Servicing (AM-FM-Transistors)
5. Television Servicing (Including Color)
6. Stereo, Hi-Fi and Sound Systems
7. Basic Electronics
8. Electronics Math

Train yourself easily, quickly for America's "big future" industry!

AUTO-MECHANICS DIVISION

1. Automotive-Diesel Master Course
2. Automotive Mechanics
3. Diesel Mechanics
4. Engine Tune-up and Electricity

Eighty million cars and trucks need maintenance! Here's opportunity for you — in manufacturing, in sales and service — in your own auto repair business!

AIR CONDITIONING-REFRIGERATION DIVISION

1. Air Conditioning-Refrigeration Servicing Course
2. Air Conditioning, Refrigeration & Electrical Appliances Master Course

Good income in installation & servicing homes, factories, schools, hotels & motels, office buildings, stores, cars, trains, buses and in servicing electrical appliances. The trained man in these fields is in demand!

HIGH SCHOOL AT HOME

National offers accredited high school programs. Take only subjects you need. Study at your own pace. Everything included at one low tuition. Check special High School box in coupon for full information and FREE catalog.

HOME APPLIANCES DIVISION

1. Home Appliance Technician's Course. Prepares you quickly for a business of your own or important jobs with manufacturers and distributors. Earn while you learn.

SEE OTHER SIDE for Big Kits at no extra cost

Resident Technical Training at Los Angeles.

You can take classroom training at Los Angeles in Sunny Southern California. N.T.S. is the oldest and largest school of its kind. Associate in Science Degree also offered in our Resident Program. Check Resident School box in coupon for details.

NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

4000 S. Figueroa St., Los Angeles, Calif. 90037

YOU ENROLL BY MAIL UNDER N.T.S. "NO OBLIGATION" PLAN. WE HAVE NO SALESMEN: IT MEANS LOWER TUITION FOR YOU.

Send Post Card for FREE BOOK and Sample Lesson

TEAR OUT AND MAIL THIS CARD TODAY. CHECK ONE ONLY.

ELECTRONICS DIVISION

- ☐ Electronics-TV Radio Servicing and Communications
- ☐ Master Course in Electronics-TV-Radio Advanced TV and Industrial Electronics
- ☐ FCC License Course
- ☐ Radio Servicing (AM-FM-Transistors)
- ☐ Television Servicing (Including Color)
- ☐ Stereo, Hi-Fi and Sound Systems
- ☐ Basic Electronics
- ☐ Electronics Math

HOME APPLIANCES DIVISION

- ☐ Home Appliance Technician's Course

AUTO MECHANICS DIVISION

- ☐ Automotive-Diesel Master Course
- ☐ Automotive Mechanics
- ☐ Diesel Mechanics
- ☐ Engine Tune-up and Electricity

AIR CONDITIONING-REFRIGERATION DIVISION

- ☐ Air Conditioning-Refrigeration Servicing Course
- ☐ Air Conditioning, Refrigeration & Electrical Appliances Master Course

HIGH SCHOOL DEPARTMENT

- ☐ High School at Home

Name _____ Age ____

Address _____

City _____ State _____ Zip ____

☐ Check here if interested ONLY in Resident Training at Los Angeles.

Dept. 201-25

QUICK, PRACTICAL WAY TO HIGHER PAY

Train with one of America's leading home-study technical schools.

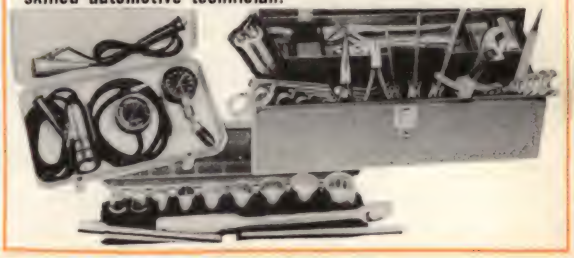
ELECTRONICS DIVISION

Electronics training opens a world of interesting high-pay jobs. Fully illustrated lessons, shop manuals and schematics teach you quickly, easily. BIG EQUIPMENT KITS come with many of the electronics Project Method courses — AT NO EXTRA COST, NO KIT DEPOSITS.

AUTO-MECHANICS DIVISION

PROFESSIONAL TOOLS AND EQUIPMENT COME WITH ALL N.T.S. AUTO-MECHANICS COURSES! NO KIT DEPOSITS REQUIRED — NO EXTRA COST!

Service your own car after the first few lessons! Earn while you learn by doing repairs for others! Complete, practical N.T.S. shop tested home training prepares you to be a highly skilled automotive technician.



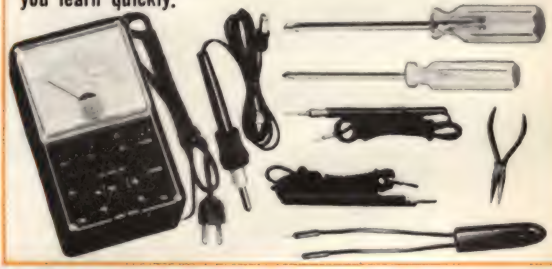
AIR CONDITIONING - REFRIGERATION DIVISION

You get the TOOLS, TESTERS, EQUIPMENT you need — with NO EXTRA CHARGE, NO KIT DEPOSITS. Learn about compressors, condensers, evaporators, gas and electric air conditioning. Covers auto and bus air conditioning as well as home and industrial. If you want to start your own business, N.T.S. provides valuable, practical help.

SEE OTHER SIDE For Course Information

HOME APPLIANCES DIVISION

With your Home Appliance Course you get — at NO EXTRA COST TO YOU — PROFESSIONAL APPLIANCE TESTER and TOOLS. You can soon begin making repairs for yourself and earn extra money fixing appliances for others. Practical, easy-to-follow instruction. Diagrams and illustrations help you learn quickly.



FIRST CLASS
Permit No. 3087
Los Angeles, Calif.

BUSINESS REPLY MAIL
No Postage Stamp Necessary If Mailed in the United States

—POSTAGE WILL BE PAID BY—

NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

4000 South Figueroa Street
Los Angeles, California 90037

FILL OUT & MAIL CARD — GET FULL COURSE DETAILS AND LEARN ABOUT THESE N.T.S. "EXTRAS"

1. "No Obligation" Enrollment
2. Student Dividend Plan
3. Bonus Classroom Training

FILL OUT AND MAIL THIS CARD TODAY!

ACCREDITED SCHOOL · NATIONAL HOME STUDY COUNCIL · NHSC

Accredited Member — National Home Study Council

60B

VACUUM MOLD AT HOME!!

WE SEND YOU AN ACTUAL FREE SAMPLE

Big Profit! Making gold, silver, bronze, all rainbow colors and clear 3-D molded plastic products at home. New instruction shows you how! Includes **FREE** materials and unique **FREE** single-cavity vacuum molder! You actually make beautifully detailed mold of anything in an evening. Start your own business in spare time. Grow big! There's a lot more — Find out! **FREE Fact Pack.** Write:

Nationwide Plastics Box 23321-FT Los Angeles, Calif. 90023

Secrets of VENTRILOQUISM Now Revealed!

Easy to learn in 60 to 90 days with our Home Study Course. **RESULTS GUARANTEED** Make Money! Be Popular! Have Fun! Big Opportunity! Radio, Television, Stage Appearances! For FREE Information regarding price and terms WRITE. You must state your age. Dummy Catalog 25c.

MAHER HOME COURSE OF VENTRILOQUISM
Box 36, Studio PM-2, Kensington Station
Detroit 24, Michigan

Broken or Loose FALSE PLATE?

Make Plates Like New

Fix it Yourself EASILY in a Few Minutes

Your plates may become broken or loose just when you need them most. With FIX-IT-KIT you can repair your own broken plates. Also tightens loose fitting plates, easily. Get permanent comfort with professional material. Complete instructions. Satisfaction guaranteed or your money refunded. *Order Now* at a new low price only **$2.98** postpaid

Dent-Fix Dental Products, Dept. 242, Box 674, Kansas City, Mo. 64141

PELLET FIRING

LUGER AUTOMATIC

- MAGAZINE LOADING CLIP
- OVER 15 MOVING PARTS
- FULLY AUTOMATIC

ONLY **$1.98**

Automatic full size model of a Luger Automatic pistol —contains over 15 moving parts. Loads 8 complete rounds which snap into the hard butt simulating a Luger. Fires 8 bullet shaped pellets. Has automatic slide action.

MOST AUTHENTIC MODEL GUN WE'VE EVER SEEN

Comes to you with working parts disassembled with cleverly engineered springs, full instructions, supply of pellets and specially designed belt holster. **Full Money Back Guarantee.** Simply send $1.98 plus 27c shipping charge or order C.O.D. From:

HONOR HOUSE PROD. CORP., Dept. 96LG02, Lynbrook, N.Y.

Big Profits in UPHOLSTERY Get Your Share... FAST!

EARN BIG MONEY **3 NEW EASY WAYS**

FREE Deluxe Illustrated Book and **FREE** Sample Lesson Pages Give Proof — Show How

1. Be your own boss, make up to 85% profit on every job.
2. Start earning right away while learning at home in sparetime — keep furniture you build, or sell for hundreds of dollars.
3. Today's home and office upholstery, reupholstery, slipcover boom make it easy to say "goodbye" to layoffs and take your pick of steady big-pay jobs.

Tools-Equip. To Keep or SELL

LEARNING EASY AS A B C

Your own two hands are all you need. UTS experts and simple instructions do the rest. You get all tools, new wooden frames, materials, fabrics, business tips, wholesale privileges, decorating magic **at no extra charge whatsoever!** LEARN FAST, EARN FAST. Thousands we've trained now doing it. Find out how—FREE.

MAIL COUPON TODAY

UPHOLSTERY TRADES SCHOOL, Dept. 510-025 (Division of Technical Home Study Schools) Little Falls, New Jersey

Established 1939

Please send me FREE book, "Your New Way to a Successful Career," and FREE sample lesson pages. No obligation — no salesman will call.

Name .....
(Please Print Plainly)
Address .....
City .....Zone.....State.....

Transistor Radio with Battery $1.96

17-Jewel Watch $2.87

Derringer Pistol $5.74

HOME-IMPORT BUSINESS—Make Big Profits

New Drop Ship Plan offers you first day profits! Deal direct with overseas sources at prices shown. Dazzling bargains with no investment. Full or spare time. Write for FREE BOOK today to...

MELLINGER, 1554 S. Sepulveda, Dept. P252, Los Angeles 25

NEW RUBBER STAMP BUSINESS PAYS BEGINNERS UP TO $9.20 AN HR.

START AT HOME IN SPARE TIME

The multi-million dollar Rubber Stamp business—once controlled by a few big companies—is now being taken over by small operators—one in each community throughout the United States. Men and Women who have this inexpensive machine can turn out huge quantities of Rubber Stamps with special wording that buyers once were forced to buy from big cities. Material costing only 27c makes a stamp that sells for $1.80. The machine that does the work is simple and easy to operate and it turns out as many as six Rubber Stamps at a time, each with different wording such as names, addresses, notices, stock numbers, prices and other "copy" needed by offices, factories and individuals. Working full capacity, it can earn as much as **$9.20 an hour for the operator!** Now you can get into the big-pay business yourself, with your own home as headquarters. You don't need experience. We supply everything, including complete instructions and eight ways to get business coming in fast. **We even help finance your start.** Start making up to $9.20 an hour from the very beginning. Cash in on the profitable Rubber Stamp business in your community, right away. We'll mail full particulars FREE and no salesman will call. Be first in your locality. Rush coupon or send your name on postcard now to:

RUBBER STAMP DIV., Dept. R-2-B
1512 Jarvis Ave. • Chicago, Illinois 60626

THIS LITTLE TABLE TOP MACHINE MAKES EVERYTHING SIMPLE & EASY

MAIL THIS FREE!

RUBBER STAMP DIV.
1512 Jarvis Avenue Dept. R-2-B, Chicago, Ill. 60626

Please rush full particulars about your financing plan and the little machine that can get me started in the profitable Rubber Stamp business at home in spare time. Everything you send me is FREE and no salesman will call.

Name .....
Address .....
City .....
Zone..... State .....

Popular Mechanics Shopping Guide

FREE "NOTE-FINDER"

Guides Your Fingers to Right Key For Every Note —Play Real Tunes Your Very First Day

LEARN PIANO! (Or Guitar, Accordion, Sax—Choice of 16 Instruments.) Mail ad today! We'll send you famous U.S. School of Music PIANO "Note-Finder" absolutely FREE. Then you can prove to yourself how you can play real music—*properly, by note*—even if you don't know a single note now.

Stop Denying Yourself These Joys!

Music can bring you new friends. Gay parties. Good times. A career. Extra Money. Help you relax, banish worries and frustrations. Satisfy your desire for self-expression, creative urge. Gain self-confidence!

SEND FOR FREE "NOTE-FINDER" AND BOOK. Illustrated book describes fascinating story of wonderful proven Course that has you playing delightful pieces right away—from your very first lesson. Simple as A-B-C. Learn at home, only few cents a lesson. For FREE "Note-Finder" and Book, mail ad today to U.S. School of Music, Studio A302, Port Washington, L.I., N.Y. *Est. 1898—Lic. by N.Y. State Education Dept.*

Name .....
(Please print)

Address .....

City .....Zone...State.....

Swedish Inventor Discovers A New Way To Trim Hair At Home In Minutes

guarantees expert, do-it-yourself trims. Quick & easy as combing. New automatic 4-way diagonal cutting action assures smooth, expertly tapered trims for men, women & children. Any desired length & style. 100% safe. Vast improvement on all straight trimmers. Saves hundreds of $$. Now, let's prove it: Try TRIMTEX 30 Days at our risk & save cost many times. If not 100% pleased, money back. Only $1.98, 2—$3.75, ppd. **FREE** Travel Case Included. No COD'S Please.

Dibben Corp.

Dept. 10F, 272-90th St., Brooklyn 9, N.Y.

Stamp Your Name PERMANENTLY

$3.95 ppd.

Identify articles you own

VERSTAMP

• ***DIE TOOL***

Comparable to a $9.00 die tool, now available at this special price.

- TOOLS
- LUGGAGE
- BOOKS
- SPORTS EQT.
- PAINT BRUSHES
- PIPES
- GUNS
- FLASH-LIGHTS
- DRAFTING TOOLS
- PLUS HUNDREDS OF OTHER ITEMS

Metal • Wood • Plastic • Leather, etc.

Stamp just about anything you own with one blow of a hammer. Made by the Henry A. Evers Co., Inc., makers of quality marking devices since 1898. Makes thousands of impressions. Send check or money order.

HENRY A. EVERS CO., INC.
72 Oxford St., Providence, R. I. 02905

For more information on articles in this issue . . . *Write*
Service Bureau, Popular Mechanics,
575 Lexington, New York 22,
New York 10022

BE A LANDSCAPE CONTRACTOR

LEARN MODERN LANDSCAPING for exciting hobby or profit. Thousands of spare or full time money making opportunities. Start a profitable business—we show you how. Study and earn your certificate at home. Write today for Free Book.

LIFETIME CAREER SCHOOLS
Dept. M-25
11826 San Vicente Blvd.
Los Angeles 49, Calif.

BRONZE FOUNDRY

Since 1935

Schools • Home Workshops • Inventors

Make your own castings of aluminum, copper, bronze, silver. Foundry sets are available in six sizes, capacity 1½ lb. to 48 lb. of red brass. 2400 Deg. F. blast furnace included with each. Write for Free Circular.

KANSAS CITY SPECIALTIES CO. DEPT. P-2 MARYSVILLE, KAN.

EARN MORE be a TAX CONSULTANT

Our students earn lucrative fees in 3 month busy tax season preparing income tax returns in spare time—and operate profitable Business Tax Service yielding steady monthly fees of $10-$50 per client, year 'round. Enjoy professional standing in dignified full or part time home-office business. No experience necessary. We train you at home and help you start. Write today for free literature. No agent will call. Licensed by N.Y. Education Dept.

National Tax Training School, Monsey X-20, N.Y.

GEARS

In Stock — Immediate Delivery

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

Send for Complete Catalog No. 10

CHICAGO GEAR WORKS
440-50 N. Oakley Blvd., CHICAGO 12, ILL.

Money Back Guarantee **HEAVY DUTY-ARC WELDER** **Five Year Guarantee**

The New 1965 Model Heavy Duty 110 Volt Arc Welder works on any 110 volt house line. You can not buy a better welder anywhere at this low price. No experience necessary. Now anyone can braze, solder, cut and weld any metal up to ¼" thick. Generates heat up to 10,000 degrees for cutting through steel plate, etc. **NOTHING ELSE TO BUY.** Comes complete with 12 ft. of heavy duty power cable. 1/16" and ⅛" welding and brazing rods, rod holder, twin carbon torch, helmet, instruction book, etc. **MONEY BACK GUARANTEE.** Try it for 10 days, if you are not completely satisfied we will immediately refund your money without question.—**FULLY GUARANTEED FOR FIVE YEARS.** If inoperative, we will repair or replace it free of charge. **SEND ONLY $2.00,** and when delivered, pay postman $12.95 plus COD postage, or send $14.95 and we will ship postpaid. Over 10,000 National Electric Welders are in use throughout the world.

ONLY $14.95

Order direct from factory; NATIONAL ELECTRIC, Dept. PM-2, DELRAY, FLORIDA

MEN! 60 STYLES FOR

W-I-D-E FEET!

E to EEEEE Only
Sizes 5 to 13

Men only. Casual, dress, work shoes that really fit. Top quality, popular prices. Money Back Guarantee.

Not sold in stores

Write Today for FREE CATALOG
HITCHCOCK SHOES, Hingham 28-B, Mass.

TURN YOUR TIME INTO CASH SHARPENING!

Be secure, own your own business, nobody can lay you off! Housewives, hobbyists, barber shops, restaurants, hardware stores, hospitals, farmers, tool rentals—everybody needs sharpening service. Hollow grind scissors, pinking shears, knives, saws, planer blades and tools. Spare or full time. Low as $39.95 Factory-to-You. Write for Free Booklet.

Write TREYCO Products
381 Niagara St., N. Tonawanda, N.Y.

FREE GASKET MANUAL

Valuable Facts for those who value Top Performance:

- Rear End Gasket Installation Tips
- Correct Way to Install Pump Gaskets
- New Type Gaskets for Valve Covers
- Important Steps in Head Gasketing
- Metal Shim Gaskets
- How to Make Sure Gaskets Fit

32 pages of tips—hints—facts about gaskets and how to improve engine performance

Published as a service to the nation's mechanics, schools and car owners by Fel-Pro, Inc., one of the world's leading gasket manufacturers.

Write:
FEL-PRO, INC.
7452 N. McCormick Blvd., Skokie, Illinois
Dept. PM-2

FEL-PRO GKS

Division of Felt Products Mfg. Co.

NEW BOOK!

Everything about welding. Practical, exciting how-to-do-it book. In color. 29 sections. One project or job pays for for it. "Better Arc Welding for Tradesmen and Farmers" by Clem Roles, North American authority. Only $3.45 plus provincial tax. Even tells how to determine metal temperature. Don't miss getting it. Order today. Also available at only 35¢ extra: Steel sample showing full temperature spectrum in radiant colors. Refund Privilege. DUTY FREE—EDUCATIONAL.

SMITH-ROLES–SASKATOON–CANADA

Play Chess by Mail!

WE'LL FIND YOU A "CHESS MATE" FOR ONLY $1.00

CHESS BY MAIL is the most fascinating hobby in the world — but how do you find a chess-mate in any city in the world? We have the answer! Send us $1.00 and we will select one for you. Specify whether you are a beginner, an average player or an expert.

MOVE BY MAIL CHESS
P.O. Box 7, Kensington Sta., Brooklyn 18, N.Y.

Art LESSONS $6 a month

Study Art for pleasure and profit. Learn Drawing, Painting, Advertising Art at home in spare time for only $6 a month. Assignments corrected with overlays and returned to you by mail. Write for FREE BOOK. No obligation.

WASHINGTON SCHOOL OF ART, Studio 142, Port Washington, L.I., N.Y. 11050. *Accredited Member National Home Study Council.* Tear ad out as reminder.

FOLBOT

fits in every home or car

FACTORY BUILT $136

CHOICE of CHAMPIONS

belongs to You

PREFAB from $47

Most inexpensive too

GENUINE Folbot RECREATION for just ONE small investment, WITHOUT the continuous burdens of complicated 'big rig' operation. You GO CAREFREE anytime with COMPACT Folbot . . . rocky streams, lakes, marsh, surf & open sea. Superior non-sinkable designs provide SAFEST low gravity center, balanced low & high seating, substantial construction, protective decks & EXCLUSIVE swivel-back COMFORT. ALL within your reach. In handy Folbot YOU GLIDE smoother, faster & NOISELESS with paddles, oars, or sails and ride softly w. 1 to 10 HP. motors. Many styles & sizes from 1 to 4 seaters, FOLDING or rigid PORTABLE come in PREFAB KIT, or expertly FACTORY BUILT

FACTORY BUILT 12 FOOTER ONLY $77

YACHT-SMART large NYLON Sail Rig $85

NEW Fabulous 16 foot $107 Factory BUILT

Folding from $129 Factory finished

NATIONAL SAFETY RECORDS

WORLD RECORD FISHING

FREE ACTION CATALOG

Mail coupon or address to: FOLBOT CORP. Dept. PM-265 Charleston, S. C. -29405

Name_____

Address_____

City_____ State_____

for YOUR SPORT & FAMILY FUN

EARN $1,000 A MONTH

LEARN A TRADE YOU LIKE

Start as a mechanic in a good paying job; then advance to shop service manager. Many make $1,000 a month and up. You learn fast in our shop because you learn with tools on real equipment. Some students earn part of their expenses while going to school.

CHECK AND MAIL COUPON

- ☐ AUTO MECHANICS
- ☐ DIESEL MECHANICS
- ☐ GAS, ARC WELDING
- ☐ HELIARC WELDING
- ☐ AUTO BODY REPAIR
- ☐ AUTOMATIC TRANSMISSIONS
- ☐ MOTOR TUNE-UP

Mail to: AUTO-DIESEL COLLEGE
226 7th Ave., No., Dept. 86, Nashville, Tenn.

Please send without obligation free catalog

NAME _____
(please print or write plainly)

ADDRESS _____

CITY _____ STATE _____

Career in ELECTRONICS?

RCA

Train at home with RCA Institutes, one of America's leading Electronic Schools. Lab work with first lesson. No installment payments required. (Licensed by N. Y. State Education Dept.) Send for free 64-page book.

RCA Institutes, Inc.
A Service of RCA
Dept. PM-25
350 W. 4th St., N.Y. 14, N.Y.

NO JOB WORRIES

PLASTEX INDUSTRY needs manufacturers on small scale for big production of Lamps, Clock Stands, Art Goods, Novelties in Plastic Marble imitation. No experience necessary. Easy material makes regular 10¢ store sellers. Moulds furnished for fast production. Small investment brings good profit. Big wholesale orders now being placed. Ambitious men have chance for real prosperity and job security. Our NEW FREE booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. A
3400 Third Ave. New York 56, N. Y.

Would You Like to Make $1,000 A MONTH?

That's what Stanley Hyman made selling the amazing new Presto Fire Extinguisher! Many others "cleaning up"—so can you! Amazing tiny new extinguisher ends fires fast as 2 seconds. Guaranteed for 20 years! Sells for only $4.95. Write for Free sales kit.

Merlite Industries, Inc., Presto Div.,
114 E. 32nd St., Dept. P-15F, New York 16, N. Y.

How to make money in MAIL ORDER

Free Copy! "How to Make Money in Mail Order" shows men, women, families how to start full or spare time big profit home mail order business. See how you get best products to sell by mail. Discover how you pocket profits in advance. Newest mail order techniques revealed. Start without experience or product investment. No salesman will call. Write for Free Copy. Mail Order Exchange, 1554 S. Sepulveda, Dept. P252, Los Angeles 25, Calif.

LEARN MEAT CUTTING AT NATIONAL

Pay After Graduation

The steady dependable trade of Meat Cutting taught easily in 8 short weeks. YOU LEARN BY DOING under actual meat market conditions in big modern school at Toledo.

For beginners or men with experience. Get a profitable store of your own. Remember, PEOPLE MUST EAT! Big pay jobs. Free employment help. Thousands of successful graduates.

Buying, cutting, percentage, pricing, advertising, selling, etc. A complete retail meat education. National School established 42 years. Get National training NOW. Pay your tuition in easy weekly payments after you graduate. Send coupon for FREE school catalog—TODAY. G.I. approved.

National School of Meat Cutting, Inc., Dept. 50-R Toledo 4, Ohio

Send me your FREE school catalog on National Training at Toledo in Meat Cutting, Meat Merchandising and Self Service Meats. No obligation. No salesman will call.

Name..... Age.....

Address .....

City..... State.....

Approved for Veterans

WATCH REPAIRING SURELY BEATS FACTORY WORK . . .

Why don't you try it too?

Consider watch repairing if you also are looking for a light, clean fascinating, and profitable trade or hobby. Part time watchmakers reporting earnings up to $6 an hour. You need no previous experience and you'll be amazed how quickly you are able to repair American and Swiss watches the way Chicago School of Watchmaking teaches you. You study at home at a fraction of the cost of attending school in person. Tuition only $5 a month. Diploma awarded.

READ WHAT BILL BOTKIN SAYS:

"I worked in a factory for two years before starting the shop, and believe me, I was glad to leave . . . I started this shop in June 4, 1962. The fourth week that I was open, I took in two hundred dollars . . . the shop is growing all the time . . . I make my entire living from it. I want to thank you for the help your school has given me in becoming independent and in becoming my own boss. I couldn't be where I am today if it were not for your home study course."
—William E. Botkin, Muncie, Indiana

CHICAGO SCHOOL OF WATCHMAKING
Founded 1908
Dept. 125, Fox River Grove, Illinois 60021

SEND TODAY FOR A FREE SAMPLE LESSON.

You'll receive a free illustrated booklet outlining this course. No obligation. No salesman will call.

FREE SAMPLE LESSON

CHICAGO SCHOOL OF WATCHMAKING
Dept. 125, Fox River Grove, Illinois 60021

Please rush FREE SAMPLE LESSON and full information to tell me how I can learn watch repairing at home.

NAME_____ AGE_____

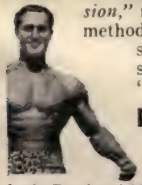
Address_____

City_____ State_____ Zip Code_____

Just Pick the Kind of Body YOU Want

CHECK THE COUPON BELOW
...Prove to Yourself How EASILY You Can Have It...Almost Overnight!

JUST tell me, in coupon below, the kind of body you want—and I'll give it to you SO FAST your friends will be amazed! *"Dynamic Tension,"* my easy, 15-minutes-a-day method, can make your chest and shoulders bulge . . . your arms and legs surge with power . . . your whole body feel "alive!"



FREE 32-page Illustrated Book

32 Pages on how **"Dynamic Tension"** changed me from a 97-lb. weakling into "World's Most Perfectly Developed Man"—and what it has done for others. Mail coupon NOW! **CHARLES ATLAS, Dept. 82, 115 E. 23rd St., New York City 10, N. Y.**

CHARLES ATLAS, Dept. 82,
115 East 23rd St., New York 10, N.Y.

Dear Charles Atlas—Here's the Kind of Body I want:
(Check as many as you like)

☐ Broader Chest, Shoulders ☐ Slimmer Waist, Hips
☐ More Powerful Arms, Grip ☐ More Weight, Solid
☐ Better Energy, Sleep ☐ More Powerful Legs

Send me, absolutely FREE, a copy of your famous book showing how **"Dynamic Tension"** can make me a new man. 32 Pages, crammed with photographs, answers to vital questions, and valuable advice. No obligation.

Name ..... Age....
(Please print or write plainly)

Address .....

City ..... Zone .... State .....

In England mail: Charles Atlas, Chitty St., London, W. 1.

EARN BIG MONEY! Learn Electric APPLIANCE REPAIRING At Home In Your *Spare Time*

START YOUR OWN BUSINESS! EARN WHILE YOU LEARN!

You can now be trained to fix refrigerators, irons, washing machines, motors, and all kinds of electrical equipment in homes, stores and factories. Using our Electronic Trouble Tracer Kit and easy-to-understand, illustrated instructions you quickly learn to make professional repairs. Set up your own profitable fix-it shop in your kitchen, basement, or garage. Earn $5 to $6 per hour, even while you learn. Age is no barrier—nor are minor physical handicaps. Start *now* . . . PAY LATER from your earnings.

Rush name, address, for FREE BOOK

CHRISTY TRADES SCHOOL
Dept. A-6503 • 3214 W. Lawrence Ave., Chicago 60625

NAME_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Send FOR FREE BOOK!

WANTED! TRAINEES!

Get into one of these important fields:

- ☐ MACHINIST TRADE
- ☐ TOOL-DIE MAKING
- ☐ DRAFTING
- ☐ TOOL DESIGNING
- ☐ INDUSTRIAL ENGINEERING
- ☐ AIR CONDITIONING REFRIGERATION
- ☐ AUTO MECHANICS

☐ At School ☐ At Home

Send for SAMPLE LESSON and FREE Aptitude Test today. Study at School or at Home. You can EARN while you LEARN!

Allied Institute of Technology, Dept. PM-25
1338 S. Michigan Ave., Chicago, Ill.

Please send me FREE information about the courses I have checked and Allied's Industrial Co-op Placement Service.

Name_____ Age_____

Address_____

City_____ County_____ State_____

FREE SCARCE MOON ROCKETS OUTER SPACE STAMPS!

Fabulous collection of all-different genuine **Airmail Stamps** from remote corners of the world — Africa, Europe, Exotic Orient, everywhere! World's Largest Airmail, Flying Doctor, Bomber, $2.00 Helicopter, many others. **PLUS** Collection of thrilling Space-Age stamps . . . Sputniks, Jets, fantastic Moon Rocket stamps. **Both of these remarkable collections — containing stamps worth up to 25¢ each!** — Send only 10¢ for mailing expenses. **Extra:** Illustrated Bargain Catalog and an attractive selection of stamps on approval.

Jamestown Stamp Co. Dept. F25PM Jamestown, New York

RUSH my Airmail Collection and other offers. I enclose 10¢ for mailing expenses. **PLEASE PRINT**

Name_____

Address_____

City & State_____

Two or four-wheel drive

JEEP or SCOUT owners

REPOWER

with V-8 or 6 Cyl. engines. **H.D. ADAPTORS** for TRUCK, CAR or COMPACT engines. Immediate del. Write, wire or phone TODAY. Free details.

HOOSIER MACH. Prods. Co.
312 SE 6th Pendleton,
Ph. 276-3442 Oregon

BLASTS MOLESTERS ...THUGS!

Amazing TEAR GAS PENCIL

100% PROTECTION!

New, big demand. Safe, personal protection to instantly stop, stun and incapacitate the most vicious man or beast. Fits pocket or purse. No selling experience needed. Handle as profitable sideline, soon you'll sell it full time. Start now, send $5.95 for demonstration kit of Automatic Tear Gas Pencil. 10 Demonstration Blanks and 3 Tear Gas Cartridges. **NOT SOLD TO MINORS.** State age with order.

Hagen Supply Corp., Dept. PM25, St. Paul 1, Minn.

BIG PROFITS. SELLS EASY TO GAS STATIONS, NIGHT WORKERS, MOTORISTS, NURSES, STORES, BANKS, HOMES

1965 Catalog OF 2900 Novelties

New

Send 10c for amazing catalog of novelties, live animals, scientific supplies, hobbies, funmakers, planes & boats, looms, magic tricks, joke articles, unusual seeds, gadget timesavers, cameras, optical goods, projectors, movies, lucky jewelry, religious novelties, disguises, musical instruments, stamps, coins, puzzles, fortune tellers, radios, auto & bike accessories, telescopes, magnifiers, compasses, banks, smokers' gadgets, artists' supplies, printing sets, engines, motors, shockers, knives, billfolds, guns, rifles, sports, books, games, plants etc. Send 10c.

JOHNSON SMITH COMPANY Dept. 633 Detroit 7, Mich.

the going's great! WARN HUBS ON YOUR 4-WHEEL DRIVE

Stop front end drag, save gas, gears

These famous hubs save gas, gears, tires, engine, improve performance, reduce maintenance costs, increase vehicle life by disengaging the front drive in 2-w.d.—automatically, or with manual controls. To get the most from your 4-w.d. under all conditions, install Warn Hubs. That's what the majority of 4-w.d. owners do. Write, or see your dealer.

Warn Mfg. Co., 9050-A Empire Way S., Seattle, Wash. 98118

BUILD A LOW COST PONTOON BOAT WITH THIS KIT

Penna-D DIVISION
CENTRAL MACHINE WORKS COMPANY

It's Fun, It's Easy Too! If you can use a saw, hammer and wrench you can build a rugged pontoon boat that will provide years of fun for your family at an amazingly low cost to you. Write for complete catalog, free.

1235 Central Avenue
Minneapolis 13, Minnesota

LEARN TO EARN!

NO CORRESPONDENCE OR HOME STUDY TRAINING

Home study does not make a good operator. Our students are taught on the machines on actual construction jobs by qualified instructors. This means they are better qualified and more readily accepted for immediate employment by contractors.

• CONTRACTOR OWNED - V.A. APPROVED

Western School is the only contractor owned and operated school in the world. These are the men who eventually hire heavy equipment operators. Write today for FREE information on how you may enroll in one of Western School's many courses.

WESTERN SCHOOL OF HEAVY EQUIPMENT OPERATION

WRITE TODAY FOR FREE SCHOOL CATALOG

Dept. M-13
Box 510
Weiser, Idaho

Associate member of Associated General Contractors and A.R.B.A.

MAKE BIG MONEY—ALL PROFIT—AT HOME

INVISIBLE MENDING

Pays up to $10 in an Hour!

Make moth holes, cigarette burns, tears, rips, *disappear* from all fabrics. Little-known craft pays extra spare-time profits at home. Write today for exciting details FREE!

FABRICON, 1555 Howard St.
DEPT. 322, CHICAGO 26, ILLINOIS

Lapidary—rockhounding—jewelry making.. add up to a fascinating creative art!

CATALOG
JEWELRY-CRAFTS FREE

STONES—JEWELRY MATERIALS
MOUNTINGS—BOOKS—CRAFT TOOLS
MACHINERY—SUPPLIES—ETC.

World's largest selection—over 10,000 items offered... from all parts of the world.

BIG SAVINGS NOW
ROCKHOUNDS
UP TO 33% OFF

SEND FOR FREE CATALOG
GRIEGER'S, INC.
Dept. 34—1633 E. Walnut—Pasadena, Calif.

FREE
MUSCLE BUILDING
INFORMATION
Sensational New Isometrics
Less Time—Less Effort—Better results
BODY-TONE, Box 638, North Miami 61, Fla.

ELECTRIFY PLAYER PIANOS PUMP ORGANS
YOU CAN QUICKLY END TIRESOME FOOT-PUMPING
With a Compact Low-Cost Lee Silent Suction Unit

EASY TO INSTALL
FULLY GUARANTEED
1000'S IN USE
write to
LEE MUSIC MFG. CO.
Box 595, Tujunga, Calif.

FIRES
200 ROUNDS
WALTHER AUTOMATIC
RAPID FIRE REPEATER

$2.98

Amazing new 1965 model WALTHER automatic . . . Holds and fires 200 rounds automatically from oversize chamber at incredible firing speed. Peak accuracy firing power to distances of 40 feet and more. Smooth jam-proof action guaranteed. No recoil. Non-lethal. Safe. No permit needed but not sold to minors under 16 years of age.

Use for target practice indoors and outdoors. Walnut-Color stock is contoured to fit the hand. Send $2.98 cash, check or money order plus 27c shipping charge. We include free ammo. Satisfaction guaranteed or money back.

BON-A-FIDE PRODUCTS, DEPT. 2-PMW, SAUGATUCK, CONN.
(200 rounds $1.) (400 rounds $2.) (1000 rounds $5.)

Excitement! Security! Good Pay!
CRIME DETECTION
LEARN AT HOME IN SPARE TIME—START NOW!

Crime everywhere is on the rise! Learn now, in your own home, the profitable profession that enables you to track down criminals and bring them to justice! Hundreds of Identification Bureaus employ I. A. S. graduates . . . trained in finger printing, police photography, handwriting identification, firearms and investigation. Our 44th year! FREE "Blue Book of Crime" . . . packed with crime facts and the full story of famous I. A. S. training. State exact age. No salesman will call. Rush Coupon!

A Correspondence School Founded in 1916.

FREE
Blue Book of Crime
MAIL COUPON

INSTITUTE OF APPLIED SCIENCE, Dept. 1352
1920 Sunnyside Avenue, Chicago 40, Ill.
Rush Blue Book of Crime . . . FREE!

NAME.....Age.....
ADDRESS.....
TOWN.....STATE.....

Thinking of college and a space age career?

Send for this booklet on
ENGINEERING TECHNOLOGY
AND ENGINEERING

Learn how you can prepare for a dynamic career as an electrical or mechanical engineering technician or engineer in such exciting, growing fields as **avionics, missiles, reliability control, fluid mechanics, data processing, metallurgy, microelectronics, and advanced aerospace research.**

MSOE offers residence study programs leading to these degrees in engineering technology and engineering:

2 years — Associate in Applied Science
4 years — Bachelor of Science

Also get facts about scholarships and financial aids, job placement and other student services, plus photographs of MSOE technical laboratories and student activities. For your copy, just mail the coupon — no obligation.

MSOE
Milwaukee School of Engineering

Milwaukee School of Engineering
Dept. PM265, 1025 N. Milwaukee Street
Milwaukee, Wisconsin 53201

Please send the "Your Career" booklet.
I'm interested in
☐ Electrical fields ☐ Mechanical fields

Name.....Age.....
Address.....
City.....State.....ZIP.....
MS-227

You'll Like Being a *SKILLED* LOCKSMITH

. . . and You'll EARN MORE, LIVE BETTER Than Ever Before in Your Life!

You'll enjoy your work as a Locksmith because it is more fascinating than a hobby—and highly paid besides! You'll go on enjoying the fascinating work, year after year, in good times or bad because you'll be the man in demand in an ever-growing field offering big pay jobs, big profits as your own boss. What more could you ask!

Train at Home—Earn Extra $$$$ Right Away!

All this can be yours FAST regardless of age, education, minor physical handicaps. Job enjoyment and earnings begin AT ONCE as you quickly, easily learn to CASH IN on all kinds of locksmithing jobs. All keys, locks, parts, picks, special tools and equipment come with the course at no extra charge. Licensed experts guide you to success.

Illustrated Book, Sample Lesson Pages FREE

Locksmithing Institute graduates now earning, enjoying life more everywhere. You can, too. Coupon brings exciting facts from only school of its kind Lic. by N.J. State Dept. of Ed., Accredited Member, National Home Study Council, VA Approved.

LOCKSMITHING INSTITUTE
Division of Technical Home Study Schools
Dept. 110-025, Little Falls, New Jersey

COPYRIGHT 1963, LOCKSMITHING INSTITUTE

EARNS BACK TUITION PLUS

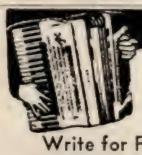
"While training, I earned enough at locksmithing to pay for the course and purchase $800 in equipment & supplies I wanted."
Joe Waren, Overland Pk., Kan.

306 Pieces of equipment LOCKS, PICKS and TOOLS supplied for use with course

LOCKSMITHING INSTITUTE, Dept. 110-025 Est. 1948
Little Falls, New Jersey

Please send FREE Illustrated Book—"Your Big Opportunities in Locksmithing," complete Equipment folder and sample lesson pages—FREE of all obligation —(no salesman will call).

Name .....
(Please Print)
Address .....
City ..... Zone ..... State .....



ACCORDIONS

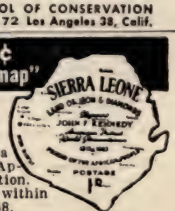
ALL TOP BRANDS
50-70% REDUC.
Spec.Imp. 120 B, 5 Sw. $119
Write for FREE BROCHURE M
ACCORDION-O-RAMA
874 Broadway, N. Y. 3, N. Y. (cor. 18 St.)

Learn how to become a
GAME WARDEN
GOV'T HUNTER, FORESTER, WILDLIFE MANAGER

Exciting job openings now for qualified men who love outdoor work. *Protect forests and wildlife — arrest violators!* Good pay, security, prestige and authority for respected career Conservation Officers. *Easy home-study plan!* Send for FREE Fact BOOK, aptitude QUIZ, and SUBSCRIPTION to Conservation magazine. *State your age.*

NORTH AMERICAN SCHOOL OF CONSERVATION
941 N. Highland Ave., Dept. 172 Los Angeles 38, Calif.

112 STAMPS — 10¢
including JOHN F. KENNEDY "map"



Unique, self-adhesive 3-color **map stamp** from far-away **Sierra Leone** honors J. F. Kennedy! Included in fabulous worldwide collection of 112 different—plus Midget Encyclopedia of Stamp Collecting—with Bargain Approvals you examine without obligation. Buy what you want, return balance within 10 days. **Rush 10c. Ask for Lot FO-58.**

ZENITH CO., 81 Willoughby St., Brooklyn, N.Y. 11201

B.S. DEGREE IN 36 MONTHS

Small professionally-oriented college. Four-quarter year permits completion of degree in *Engineering* or *Business Administration* in three years. One year Drafting and Design Certificate program. Founded 1884. Rich heritage. Excellent faculty. Small classes. Well-equipped labs. New library. Residence halls. 300-acre campus. Graduate placement outstanding. *Modest costs.* Enter March, June, Sept., Jan. *For Catalog And View Book, write Director of Admissions*

TRI-STATE COLLEGE
425 College Avenue • Angola, Indiana

FREE GUIDE *Reveals 200 Ways to Make Extra Money*

YOU can turn your spare hours into cash ($25 to $100 a week) by selling products and services to friends and others. Famous *Salesman's Opportunity Magazine* shows you how. Contains hints, plans, hundreds of offers. No matter what your age, experience or occupation—write TODAY for next 5 issues—absolutely FREE. Send no money just name.
OPPORTUNITY, 850 N. Dearborn, Dept. 141, Chicago 10, Ill.

Print Your Own

Cards, Stationery, Advertising, Circulars, labels, photo and movie titles, church work, tags, etc. Save money. Sold direct from factory only. Raised printing like engraving, too.

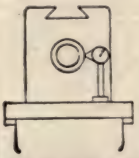
Own a Printing Business

Print for Others, Good Profit. Have home shop. Junior press $15; Senior $35 up. We supply everything. Easy rules. Pays for itself in short time. Write now for free details.
KELSEY PRESSES, Z-37 Meriden, Conn.

Build This Beautiful
Grandfather Clock

We show you how at price you can afford. Send only $1.00 for complete plans and instructions plus information-packed catalog of clock movements, dials, blueprints and kits for constructing Grandfather, Grandmother, Terry and other fine clocks.

MASON & SULLIVAN CO.
DEPT. PM OSTERVILLE, MASS.



—Improve Machinist's Skills—
MACHINE TOOL RECONDITIONING
& the Art of Hand Scraping (6th printing)

Now get information, ideas & know-how from this time-tested, instructive book. Send today for free folder describing illustrated manual for machinists.

MACHINE TOOL PUBLICATIONS
215-P Commerce Bldg., St. Paul, Minn. 55101

IF YOU HAVE HERNIA

it is important that you Get this *NEW FREE BOOK*

This New **FREE** Illustrated Book tells how Rupture can be treated by a mild **NON-SURGICAL METHOD** and **THAT THE TREATMENT** is backed by a Lifetime Certificate of Assurance.

The book explains that, although many people have not heard of, or have been misinformed about the non-surgical treatment, it has a long history of use and is recognized by authorities today.

Many men and women from all over the country have taken the **NON-SURGICAL TREATMENT** and have reported it has proven effective.

Write today for this New Free Book that tells **HOW** and explains **WHY** more and more sufferers are using **MODERN NON-SURGICAL** Methods of treating their ruptures. Act Now. No obligation.

EXCELSIOR MEDICAL CLINIC
Dept. E. 6134 Excelsior Springs, Mo.

GROSSED $1101.35 IN 4 WEEKS

Some make more — some less...

Many men have discovered how to be independent, to be free of layoffs and bosses. L. S. Mason grossed $1101.35 in 4 weeks. T. N. Cochy averaged $806 per month 12 months. H. Lemon says, "I netted $133 in one 8-hour day." A father-son combination grossed $44,000 their second year.

How much you earn depends largely on you, but we help you to start and work with you for your success. You need no special skill, no large investment. Start part time if you wish. Hire helpers as needed.

NO SHOP NECESSARY • Our PORTABLE ELECTRIC DETERGER shampoos rugs, carpets right on customer's floor. Wonderful results bring you repeat business, large fees. So efficient and safe, it is used by largest hotels and railroads.

OURS IS NOT A LEASE ARRANGEMENT

• You are free to operate in an independent manner. You sign no contract. You own the deterger outright and are always your own boss...and every dollar you take in is yours to keep. You pay no fees, or dues, or royalties to anyone, and enough supplies come with it to return far more than your investment. Many earn the cost of the deterger in a week or two. It costs nothing to get the details...write TODAY.

MAIL COUPON TODAY FOR FREE BOOK

VON SCHRADER MFG. CO., • 210 "R" Pl., Racine, Wis.

Without obligation send me **FREE** booklet about your RUG DETERGER and tell me how I can start my own permanent, profitable business.

Name_____

Address_____

City_____ Zone____ State____

HIGH WAGES for TRAINED "GROUND-BREAKERS"

LEARN HOW at the World's FIRST and LARGEST Heavy Equipment School

National School has graduated *MORE* heavy equipment operators than any other school in the world! You, too, can benefit from National's ten years experience in training men to earn as much as $10,000 per year and up! Actual field training on school-owned huge diesel-engined machines—*NOT* a correspondence school. Full 220-hr. and 440-hr. contractor-recommended courses. Full-time Job Advisory Director. Associate Member AGC and ARBA. Budget payment plans available. VA approved. Decide *NOW* to earn HIGH WAGES as a heavy equipment operator.

Mail the coupon TODAY

NATIONAL SCHOOL of HEAVY EQUIPMENT OPERATION

Dept. D-60, P.O. Drawer 1686, Charlotte, N.C.

Please send me FREE complete information without obligation about how I can become an operator.

Name_____ Age____

Address_____

City_____ Zone____ State____

ENROLL-EARN YOUR DEGREE

of Bachelor of Bible Philosophy (B.Ph.B.), Master of Bible Philosophy (M. Ph. B.), Graduate of Bible Philosophy (G. Ph. B.), or Doctor of Metaphysics (Ms. D.). Chartered by State. Correspondence Courses only. Please write for FREE BOOKLET.

AMERICAN BIBLE INSTITUTE
Dept. PM, 408A W. 75th St., Kansas City, Mo. 64114

FREE—400 GENUINE POSTAGE STAMPS

Stamp Collector's Bonanza. From Africa—Europe—Asia and British Empire worth $10.00 catg. prices, a fascinating mixture from convents—banks—etc. Who knows what you will find! All yours as our get acquainted gift. Adults only. Free valuable collectors handbook. Fine collection of stamps for your inspection will also be enclosed.

FRASEK CO., PM-2 **White Plains, N.Y.**

REAL ESTATE BE A BROKER

PAYS BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! Graduates report making substantial incomes. Start and run your **own business quickly.** Men, Women, all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, & related subjects. **STUDY AT HOME** or in classrooms in leading cities. **DIPLOMA AWARDED. Write TODAY for FREE Booklet!** Accredited Member National Home Study Council. (Established 1936)

FREE BOOK TELLS HOW

WEAVER SCHOOL OF REAL ESTATE
3521-P Broadway **Kansas City, Mo. 64111**

DRAINS cellars, cisterns, wash tubs; **IRRIGATES - CIRCULATES - SPRAYS** **$8.95**

1,001 uses. Stainless shaft. Won't rust or clog! Use 1/6 HP motor or larger . . . ¾ HP for up to 2,400 GPH; 450 GPH 80' high; or 1,800 GPH from 25' well. 1" inlet; ¾" outlet. Coupling included free. **$8.95.** **HEAVY DUTY BALL-BEARING PUMP.** Up to 5,200 GPH; or 3,000 GPH from 25' well. 1¼" inlet; 1" outlet. **$12.95** *Postpaid if cash with order. MONEY BACK GUARANTEE*

Centrifugal and Gear Pumps in All Sizes

LABAWCO PUMPS, Belle Mead 7, New Jersey

A New FREE BOOK for

MEN PAST 40

Troubled With Getting Up Nights, Pains in Back, Hips, Legs, Nervousness, Tiredness.

This new Free Book tells that if you are a victim of the above symptoms, the trouble may be traceable to Glandular Inflammation . . . a condition that very commonly occurs in men of middle age or past and is often accompanied by despondency, emotional upset and other mental and nervous reactions.

The book explains that, although many people mistakenly think surgery is the only answer to Glandular Inflammation, there is now a non-surgical treatment available.

NON-SURGICAL TREATMENTS

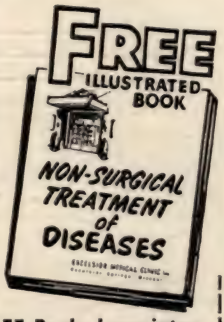
This New Free Illustrated Book tells about the modern, mild, Non-Surgical treatment for Glandular Inflammation and that the treatment is backed by a Lifetime Certificate of Assurance. Many men from all over the country have taken the NON-SURGICAL treatment and have reported it has proven effective.

The Non-Surgical treatment described in this book requires no painful surgery, hospitalization, anesthesia or long period of convalescence. Treatment takes but a short time and the cost is reasonable.

REDUCIBLE HERNIA | HEMORRHOIDS

Non-Surgical treatment for both Reducible Hernia and Hemorrhoids, the book explains, can usually be taken at the same time as treatment for Glandular Inflammation.

This new Free Book is fully illustrated and deals with diseases peculiar to men and women. It tells HOW and WHY New Modern NON-SURGICAL Methods are so successful today. Fill Out Coupon.



Excelsior Medical Clinic, Dept. M 6150 Excelsior Springs, Mo.

Gentlemen: Kindly send me at once, your New FREE Book. I am interested in full information. (Please Check Box)

☐ Glandular Inflammation ☐ Hernia ☐ Hemorrhoids

Name.....

Address.....

City.....State.....

GET INTO ELECTRONICS

V.T.I. training leads to success as technicians, field engineers, specialists in communications, guided missiles, computers, radar, automation. Basic & advanced courses. Electronic Engineering Technology and Electronic Technology curricula both available. Assoc. degree in 29 mos. B.S. obtainable. G.I. approved. Start Feb., Sept. Dorms, campus. H.S. graduate or equivalent. Catalog.

VALPARAISO TECHNICAL INSTITUTE
DEPARTMENT D, VALPARAISO, INDIANA

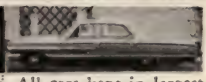
Build BEAUTIFUL CLOCKS

Send just 25¢ for 1965 illustrated clock book—the most complete available, describing plans for grandmother, grandfather, wall and shelf clocks easily and inexpensively made with simple tools. Also pictured are a wide selection of finest dials, quality movements, and kits in high-grade cherry, mahogany and walnut.

CRAFT PRODUCTS, Elmhurst, (1) Illinois

BUY CARS BELOW WHOLESALE COST!

64 FORD CUSTOM or 64 DODGE 330 $899



Maintained to pass state inspection. All cars kept in largest indoor warehouse in U.S. Formerly taxis. All markings removed. No different than regular passenger cars.

63 FORD CUSTOM	549	63 STUDEBAKER LARK	399
63 DODGE 330	549	62 PLYMOUTH, STD.	499

All cars 4 door, 6 cyl. auto., good tires, jack, heater

WRITTEN GUARANTEE • MOTOR • BODY

·Delivered anywhere in U.S. for $50 a car plus gas & oil.

ONLY $50 DEPOSIT RESERVES A CAR FOR YOU

·Call, wire, write: LEN PEARL for FREE Photo & Catalogue.

Phone: (212) SH 7-1365

INTERNATIONAL FLEET CAR WHOLESALERS INC.
4733 Chestnut St., Philadelphia, Pa.
Member Better Business Bureau

NEW Improved Accurate Scope-Shot

Price Complete with 50 DISINTEGRATING PELLETS They crack like a rifle when they hit—leave mark—puff of smoke! $1.95 P.P.

World's Finest Precision SLINGSHOT Scope-type sight!

ROUTS PESTS!

Price without pellets $1.50 P.P.

Order Now!

Big Bag of 250 EXTRA Pellets 98¢ P.P.

Millions Sold! Patent No. D-178,837

Pure gum rubber slings. Beautifully polished cast aluminum stock. Pistol grip. So powerful it kills small game. Fits pocket perfectly! Guaranteed. **FREE** shooting manual.

Order NOW from: **GENERAL SPORTS**
4184-M2 Apple Street, Cincinnati 23, Ohio

PROTECT YOURSELF!

TEAR GAS

NO PERMIT REQUIRED

TEAR GAS GUN OUTFIT

This all-steel, .22 cal. TEAR GAS gun shoots 6 times as fast as you can pull the trigger. Also fires blanks for alarm, or dog training, and flares for emergencies. Complete with 6 tear gas shells and instructions.

BLUE STEEL $9.98
CHROME $11.98

TEAR GAS PENS

This handy size chrome pen shoots the new powerful .38 spec. MAGNUM cartridge. Will halt an attacker— in his tracks, renders him helpless while you summon aid!

Complete with 2 shells . . . $9.98

As above, two shot with 2 shells . . . $11.98

.22 cal., single shot with 3 shells . . . $4.98

☐ Gun $9.98 ☐ Pen $9.98 ☐ .38 Shells .75 ea. 20 for $13.50
☐ Gun $11.98 ☐ Pen .38 Cal. 2 shot $11.98 ☐ .22 Shells .15 ea. 100 for $13.50
☐ Pen $4.98 ☐ Gun Holster $2.00 ☐ .22 FLARES 6 - $1.50

TEAR GAS DEVICES CO. • 136 A MADISON AVE. • ST. LOUIS, MO. 63122

Pre-Paid in U.P.S. areas. Others Express Collect (NO C.O.D.'s) Send Check.

CLASSIFIED ADVERTISEMENTS

Rate: $1.40 per word payable in advance each insertion. Minimum insertion ten words. To be inserted under the proper classification, copy must be in our office by the 15th of the second month preceding date of issue. **The next available issue to place an advertisement in America's No. 1 Classified Section is April. The closing date is February 15. Send remittance and order to C. A. Martin, Popular Mechanics, 575 Lexington Avenue, New York, New York 10022.**

POPULAR MECHANICS

AUTOMOBILES, MIDGET CARS

BUILD Midget racers, motorize bicycles, speedmobiles, etc. Complete illustrated book $1.00. F. A. Kaleda, 3322 Bonair, Warren, Ohio.

AUTO SUPPLIES AND EQUIPMENT

FOREIGN Car parts. Discounts. Catalog. Box 7, Elmont, N.Y.

CROSLEY. New, used, parts. Discounts. Catalog. Box 7, Elmont, N.Y.

JEEP Parts! For military and civilian. At great savings. Largest inventory. Catalog for owners and dealers. Inquiries invited. American Auto Parts Co., 1830-PM Locust, Kansas City, Mo.

BUILD Yourself! 200 MPG carburetor, V-8, six, etc.! Complete patent drawings. Description, $5.00. F. Schwab, Lakeville, Ind. 46536.

RING-Valve job while driving, $6.00 postpaid. Guaranteed! Nothing like it! Many mechanics recommend! Motaloy, Grantham, Penna. 17027.

JEEP Owners—V8 conversions. Read Jeep Owners ad, page 66.

ATTENTION Travellers! Red flasher warning light. Battery powered. Suction mounted, $1.25 postpaid. Wingert Imports, 925 West 3rd, Hutchinson, Kansas.

AUTO Welding repair training in world's largest non-profit welding school. Low tuition. Free booklet. Hobart Welding School, Box M-25, Troy, Ohio.

MODEL A Ford parts. New illustrated catalogue 50¢. Mark, Layton, New Jersey.

IMPROVE Starting and gas mileage. Automatic choke releaser. $3.00. Postpaid. Patented. Guaranteed! Hayes Manufacturing Company, Box 7631, Baltimore 7, Maryland.

HYDRAULIC jack repair kits, parts and supplies. Catalog 25¢ (in coin). Hydraulic Jack Packing & Tool Co., P.O. Box 50, Bloomfield, N.J.

REPACK Sealed rear axle bearings, illustrated instructions $1.00. Pat's Way, Box 2547, Odessa, Texas 79760.

SPARK-Plug socket wrench, built in ratchet, 4" thru 8". $3 ppd. Pat pend. Robert Arbuckle Mfg. Co., Hood River, Oregon R3.

WW II jeep handbook, 380 pages, parts, illustrations, only $4.50. Back Country Bookstore, Box 866E, Tarzana, California.

NEW—Improved—patented—spark plug gauge and cap adjuster. $1.00. Wrona Better Gauge, Box 5968, Chicago, Ill. 60680.

FACTORY Unconditionally guaranteed, Champion AC Auto-lite spark plugs, Points and Condenser 3.19 Delivered. Murray Sales, 8189 Heather, Fontana, Calif.

LITE-Buzzer automatically reminds you to turn off lights when parking car. Buzzes when ignition is turned off if lights are still on. About a minute to install on fuse panel clips. Lite-Buzzer clamps under dash. Compact. Works in any car. Complete instructions. Guaranteed. Only $3.95 prepaid. No COD. Lyn Products, Inc., 44 Industrial Road, Crystal Lake, Illinois.

AUTO TRAILERS

TRAILERS: All kinds—boat, box or camping. Also: All parts to build your own. Send 25¢ for catalog. Norjack, 616 S. 108th St., Milwaukee, Wisc.

PICKUP Campers. Pre-cut kits. Blueprints. Supplies. Literature 10¢. Comstock Trailers, Parsons 4, Kansas.

PRE-CUT Pickup camper kits. Ready to assemble. Free literature. Snowy Mountain Campers, PM, Lewistown, Montana.

TRAVEL Trailers, pickup campers, truck covers, working plans, $3.50. Details 10¢, materials available. DuPage Coach, Box 86 PM, Wood Dale, Illinois.

PICKUP Camper, trailer or pickup-cover. Build yourself, save: Complete plans $3.95 each. Equipment catalog $1.00 (refundable). Details 10¢. Viking Camper Supply, 94-F Glenwood, Minneapolis, Minn. 55403.

MOTORCYCLES, BICYCLES, MOTORSCOOTERS AND SUPPLIES

HARLEY-Davidsons — Used bargains. New, used parts, accessories, all models. Bulletin 25¢. Knuth's (Factory Dealer), 1753 Muskego, Milwaukee, Wis.

RECONDITIONED Motorcycle motors. Large stock Indian Cushman Vespa Mustang NSU parts. Indian Motorcycle Sales, Kansas City, Missouri. 64127.

KART $29, Motorbike $20, minibike $35, kart frame $6, minibike frame $5, less engines. Engines $5 up. (mailorder only). Send 25¢ (35¢ for first class mailing) for directory-catalogue number 122, listing these and hundreds of other bargains, homebuilders parts, plans, etc. Midget Motors Directory, Athens, Ohio.

MOTORCYCLE And motorscooter parts new-used for all makes, models. Big savings. Sam's RT-10, Box 131, San Antonio, Texas.

BUILD Motorbike from Bicycle! Plans, $1.00: Go-Byk Industries, Rothsay, Minnesota 56579.

BE A BSA Motorcycle dealer! Some choice territories still open for ambitious men who want their own motorcycle business. Enjoy your favourite hobby, be independent in a business that gives you the financial rewards of your work and selling ability. Nominal investment required. (Offer open only in area where we do not now have a dealer.) Write: BSA Incorporated, Dept. PM, 639 Passaic Ave., Nutley, N.J.

AVIATION

AIRBOAT-Snowplane propellers, plans, kits, supplies. World's lowest prices on gauges, throttles, spark plugs, gas-oil hose, oil coolers, primers, tachometers, hubs, engine mounts, conversion parts, fittings. 125 H.P. Lycoming engines, gaskets, parts. Catalog 25¢. Banks-Maxwell, Box 3301E. Ft. Worth, Texas 76105.

HOMEBUILT. Real enclosed helicopter. 24 pages ideas, information, $2.00. Build "executive" helicopter, drawings, specifications, $1.50. Helicopter Development, Box PM147, Washington, New Jersey.

BATTERIES, GENERATORS

BATTERY Reconditioning kit, includes molds, material, complete instructions. Battery Shop, 18182 Vierra, Salinas, California.

NEW! Battery repair-rebuilding manual. Just out! $3.00. All kinds new-used battery tools, molds and equipment. Capitol Battery Equipment Co., 1216 Madison Ave., Montgomery, Alabama.

AMAZING Additive increases battery power! Write: R. Patterson, St. Croix Falls, Wisconsin.

REDUCE Your battery problems $1. Creative Ideas, 316 S. Wayne St., Arlington, Va.

COMPLETE Rebuilding Manuals! Batteries $3.00. Hydraulic jacks $3.00. C.O.D. accepted. Bayer Publications, 938 Betty Avenue, Neenah, Wisconsin.

ELECTRICAL SUPPLIES

LAMP, Electrical parts, wholesale. Thousands of items for repairing, converting. Catalog 35¢. Brown Lamp, Box 305, Clayton 5, Missouri.

80,000 CANDLEPOWER world's most powerful flashlight from only six regular flashlight batteries in 3-cell lengths, waterproof underwater pierces murky depths, on land cuts thru fog, smoke, illuminates objects clearly mile away, beam leaps out twenty miles, sent ppd. $12.95. Douglas Enterprises, 2634 N. 40th Street, Milwaukee, Wisconsin 53210.

LAMP Parts. Catalog, prices, wiring instructions. 50¢. Refunded first order. Gyro, 5208P N.W. 35 Ave., Miami 42, Fla.

WELDING, SOLDERING, PLATING

CHROME Plating equipment, supplies. All other finishes. Home workshop and production sizes. Send $1.00 (refundable) for formulas, operating data, equipment guide and catalog. HBS Equipment Division L50, 3445 Union Pacific Avenue, Los Angeles 23, Calif.

ACETYLENE Welding outfits new $69.50; used $50.00; Arcwelders $69.50; Eagle Welding, Dept. PM, 5058 Broadway, Chicago, Ill. 60640.

FREE Catalog. Welders, kits. Build 400-ampere aircraft generator welder. Plans 35¢. Dunbar, Chaska 17, Minnesota.

A.C. WELDERS, Oil protected, $49.50. Morris, 1070 Inner, Schenectady, New York 12303.

MACHINERY, TOOLS, SUPPLIES

MACHINIST. Small shop supplies. Campbell Tools, 1424 Barclay, Springfield, Ohio.

SEND For free 28 page pocket size illustrated catalog on angle vises, drill press vises, milling attachments, and rotary tables. No shop complete without these tools. Palmgren Steel Products, 8365 South Chicago Avenue, Chicago, Illinois 60617.

BARGAIN New cutting tools, free list. Kabaco Tools, Inc., 4106 East Eight Mile Road, Detroit, Michigan 48234.

CIRCULAR Saws—sanding discs—cleaned in minutes. Newells Pitch & Gum Remover, 4-oz. $1.25. Newells Products, Desert Center, California 92239.

TWELVE Assorted, 6 inch long Abrasive Files and Hones. Sharpen tools. Smoothen rough edges. File glass, stone, ceramics. Can be shaped to file contours, threads, slots, holes including bottoms. Excellent value. $3.00 postpaid, 50 states. You must be pleased or cheerful refund guaranteed. J. Reinherz Company, Maywood, Illinois.

STANLEY, Millers Falls, Skil, Disston, Wiss, Plumb, Channellock, Bonney, Herbrand, Ridgid, and hundreds of other nationally advertised brands at prices hard to beat. Send 25¢ for our big tool catalog today! Silvo Hardware, 107PM Walnut, Phila. 6, Penna.

ENGINES, MOTORS, DYNAMOS

WINDING Data. 275 motors, single and three phase $1.10. Data Company, 512 Kensington, Kansas City 24, Mo.

REWIND Electric motors! Details free! Modern, Box 10025, Kansas City, Mo. 64111.

BUILD Armature growler yourself. Complete instructions. $1.00. Natural Color Printing, 155-A, North Franklin Hempstead, New York 11550.

REWIND Motors yourself. Complete instructions, $1.00. Lewis Manufacturing, Howell, Michigan.

GOVERNMENT SURPLUS

JEEPS $64.50 . . . Boats $6.18 . . . Typewriters $4.15 . . . Airplanes, Sporting Equipment, 100,000 Bargains typically like these "as is" direct from government in your area. For complete directory and surplus catalog Send only $1.00. Surplus Service, Box 820-A, Holland, Michigan.

GOVERNMENT Surplus. Complete sales directory $1.00. Surplus Publications, Box 45781, Los Angeles 45, California.

JEEPS—$62.50, Typewriters—$4.15, cars—$32.78, guns, walkie-talkies, binoculars, televisions used. Typical surplus prices. Exciting details free. Enterprises, Box 402-X14, Jamaica 30, New York.

JEEPS $64.50, Airplanes $75.20, boats $6.18. Many others direct from U.S. Government. For complete "Directory" and catalog send $1.00 to Quality Surplus, PM2, Box 22038, Indianapolis 22, Indiana.

GOVERNMENT Surplus, how to buy in your state at tremendous savings. "Directory" gives all details. "Catalog" with pictures, prices of over 400 surplus items included. Send $1.00. Quality Surplus, 422-PM2, Washington Building, Washington, D. C.

MILITARY Closing public sales—(Directory Information)—$1.00. Service, #425MP, Nanuet, New York.

JEEPS Low as $62.50—autos—boats—thousands others, "as is" direct from Government! "How to Buy in Your State and 1965 Directory," send $1.00. Surplus Disposal, 2230-PB Wisconsin, Washington, D.C. 20007.

HOW And where to buy government surplus. $1.00. Franklin, Box 532, Owosso, Michigan 48867.

GOV'T. Surplus. How and where to buy in your area. Send $1.00. Surplus Information. Headquarters Building, P.M., Washington 6, D.C.

BOATS, OUTBOARD MOTORS

30 H.P. Outboard motors or powerheads. Brand new 1963's $185.00. Write: Motors, P.O. Box 111, Perry, New York.

NEW, Used, rebuilt marine motors. Marine conversions, fittings. Free catalog. Stokes Marine Supply, Dept. 24, Coldwater, Michigan.

MARINE Conversions. Ford, Chevrolet, Jeep engines. Catalog 25¢. Lehman Manufacturing Company, 800 Elizabeth Avenue, Linden 4, N. J.

BUILD Your own boat from our large-scale blueprints. Books of plans give how-to-build help. Hundreds of professional designs—motor, sail or auxiliary—for amateur builders. Free catalog. MoToR Boating, 959 Eighth Ave., Dept. RS, New York 19, N. Y.

BOAT Kits! Factory molded fiberglass or pre-assembled plywood. 50 models, 12' to 30'. Free catalog. Luger. Dept. BC-65, 9200 Access Road, Minneapolis 31, Minn.

BOAT Plans, frame kits, full size patterns all prepared specially for amateurs. Send 50¢ for new catalog illustrating 55 proven designs including sail, inboards and outboards from 7' to 28'. Glen Designs, 9152 Rosecrans, Bellflower, Calif.

KAYAKS—One-man $16.50; two-man $22.50; sail attachment $16.50. Exciting Sitka Kayak kits known world wide for speed and safety. Assembled in one afternoon. Free pictorial literature. Box 78-P, Brecksville 41, Ohio.

FIBERGLASS Boat covering. Wholesale prices. Free literature and sample. Seifert's. Box 1206-M, Green Bay, Wis.

AIRBOAT—Air propel your boat or canoe with an Airboy Drive—5, 9 or 18 HP. Airboats, Inc., Box 5306, Denver, Colorado.

200 BOAT Plans, $1.00 up, kits. Catalogs: Powerboat $1.00, Sailboat 40¢. Marinecraft, Box 161-M, Brighton 35, Mass.

INBOARD Engine kits for Chev., Pont., Buick, Ford, etc.—Free catalog. Star Marine, Berkeley 10, Calif.

FIBERGLASS Canoes. Three exciting models. Easily assembled kits. $29.50 up (factory direct). Free literature. Riverside Canoes, 5811A Victoria Ave., Riverside, Calif.

FULL Size, cut-to-shape boat patterns, blueprints, 7½-38 feet. Big new illustrated "Build a Boat" catalog of 64 designs, including catamarans, cruisers, runabouts, skiffs, outboard boats, sailing, racing, houseboats, 50¢. "How to Build a Boat" booklet, $2.50. Cleveland Boat Blueprint Co., Box 18250, Cleveland, Ohio.

SPORTING GOODS, GUNS, FISHING, SKIN DIVING, ARCHERY

GOVERNMENT Surplus Bargains, in guns, ammunition, edged weapons, hunting, camping, fishing items. Write for giant free catalog. P & S Sales, Box 155, Tulsa, Oklahoma.

AMAZING Centrifugal Force weapon. Ancient hunting weapon "rediscovered," powerful, deadly. More impact than hi-power rifle. Rush $2.98. Thrust Products, 503 11 St. S.E., Washington, D.C.

NEW "Home-Finder" compass. Unique memory dial. Details free. Jeret, Box 1357, Sarasota, Florida 33577.

BIG Money raising crickets and 12 inch African fishworms. Free literature. Carter Ranch, Plains, Georgia.

FREE . . . Wholesale catalog. Beads. Spinners. Lure parts. Sinker molds. Jigs. Reels. Finnysports (ME), Toledo, Ohio 43614.

MOLDS For casting your own fishing sinkers. Free illustrated booklet. Reading Instrument Co., Box PM78, Reading, Penna.

FISHERMAN'S Dream book free! 170 pages. Sweetest pocket size catalog ever! Do-it-yourself stuff galore: for making: nets, turtle traps, landing nets, rods, lures, sinkers, plastic worms, flies, fish smoking rig. Here's everything including latest rods, reel 'n gadgets. Send card: Netcraft Co., Dept. PMM, Box 5510, Toledo 13, Ohio.

NEW M1 .30 Cal. Carbines. $65.00. Rutgers Gun Center, 127 Raritan, Highland Park, N.J.

LIVE Catch animal trap. Coon, rabbit, stray cat, pigeons. Low priced. Guaranteed. Information 10¢. Johnston's, Waverly, Kentucky.

KNIVES! 25 Exciting models. Fishing, hunting, camping. Grand 'H' Specialties, Boston 14, Mass.

ROTO-Hook guarantees catch with every strike. 10 for $1.00, postpaid, assorted. Box 1422, Greenville, S.C.

FANTASTIC Device that guarantees to improve your fishing catch. Free details. TR Enterprises, Box 472-GPO, Brooklyn, N.Y. 11202.

MOLDS For fisherman's sinkers, jigs, squids, casting and spinning lures. Free catalog. Sweet's Molds, Tonawanda 1, New York.

ATHLETIC EQUIPMENT BODY BUILDING COURSES

PHYSICAL Perfection courses, guaranteed. Mail 25¢ to Sid's System, (PM-2-65), South Gate, California.

BAR BELLS, Courses, equipment. Catalogue 10¢. Good Barbell, B-1495, Hendersonville, N. Car.

60 SECONDS Daily gives perfect physique. Complete course $2.00. Healthglo, Box 817, Beamsville, Ontario.

DON'T Be bullied! Learn direct from the Orient. Chinese Kung-Fu Karato, the secret Oriental Art of Self-Defence, so effective even a Judo-Karate expert respects. Defeat aggressors within seconds. Size don't count! For free details by Air rush your name and address also by Air to Asia's Greatest Karato Master:—Leong Fu (Dept. MI/4), 119 Anderson Road, Ipoh, Malaysia.

"GIANT Arms." Dr. Young's, D.C. revolutionary discovery, $2. Satisfaction or refund. Gaucho, Box 9309-S7, Chicago 90.

CAMPING EQUIPMENT AND TENTS

PICKUP Camper, trailer or pickup-cover—Build yourself, save! Complete plans $3.95 each. Equipment catalog $1.00 (refundable). Details 10¢. Viking Camper Supply, 94-FA Glenwood, Minneapolis, Minn. 55403.

FUN Camping and travel book. Keeps children busy. Send $1.00. Jeret, Box 1357, Sarasota, Florida.

CAMPING Equipment, unusual selection. Morsan's own quality tents (200 styles) finer fabrics; sleeping bags (80 styles); every camping convenience imaginable. Free giant catalogue-guide-handbook. Morsan, 810-R Route 17, Paramus, New Jersey.

BINOCULARS, TELESCOPES, MICROSCOPES, MAGNIFIERS

BINOCULAR Sale! Free Color Catalog 100 models $9.95-$250.00. Write United. 9043 So. Western, BCAT 5108, Chicago, Ill. 60620.

BINOCULARS Folding. Limited supply. Rush $2.00. Patty Kevin, 1645 Broadway, Camden, New Jersey.

BUILD Your own reflector telescopes, complete kits; mirrors, eyepieces, tripods. Free catalog F describing other accessories sent on request. Also free brochure describing amazing line world famous "Dynascope" reflector telescopes. Criterion Manufacturing, Dept. KPM 23; Hartford, Connecticut.

SCIENCE Bargains! Lenses, telescopes, binoculars, microscopes, kits, parts, war surplus. Send $1.00 for beginner's 10-lens kit with instruction booklet. Order Stock 2-CH. Request free 148 page Catalog CH. Edmund Scientific Co., Barrington, New Jersey.

PLANTS, NURSERY SUPPLIES

HANDBOOK On dye plants, complete directions for dyeing with natural materials. 100 pages, illustrated. 4 pp. color. $1.25. Brooklyn Botanic Garden, Brooklyn, N. Y. 11225.

WANT Greatest cash crop working for you? Write Ginseng, Asheville 53, N. C.

EARTHWORMS, CRICKETS, FROGS

HYBRID Redworms 1,000—$3.00, 2,000—$5.00, 5,000—$8.00, 10,000—$14.00. Bedruns 20,000—$20.00. Postpaid with raising instructions. Brazos Bait Farms, Route 9, Waco, Tex.

FREE Literature. Big money raising African Nightcrawlers, Redworms. Three Oaks Ranch, Dresden, Tennessee.

MEN! Women! Make money raising bait for us at home. Red Wigglers, Warsaw 45, Indiana.

SUCCESS For you! Raise fishworms and crickets. Write for free literature and our success story in Life Magazine. Let us teach you our secrets of success. Hybrid redworms 3000, $5.95. Carter Redworms, Plains, Georgia.

FROG Raising. Young frogs and giant breeders. Stock your lakes, pond. Nu-Tex Frog Farm, Box 4029, Corpus Christi, Texas.

GEORGIA Redworms. Large, 1000—$4.00, 5000—$16.00. Bedrun, 5000—$7.50, 10,000—$12.50. Postpaid promptly. Hall's, Hilton, Georgia 31758.

EARN Money raising fishworms for us! Exciting details free! Oakhaven—56, Cedar Hill, Texas.

FARMS, FARM LANDS, REAL ESTATE

FLORIDA Campsites—deep in the heart of the great Ocala National Forest. Best hunting and fishing. Free maps and photos. Howard Vernor, DeLand, Florida. AD63052(1-2)

$1 ACRE—Canadian border—hundreds campsites, islands, farmlands, directly from tax authorities. (Non-profit). Lists, photographs mailed. Register, Room 203, 92 King St., E., Toronto 1, Canada.

ABANDONED Timber Leaselands! Choice 640 acre Sportsmen's paradises still available—$20.00 plus $6.50 Taxes yearly. Maps, pictures, $1.00 (Refundable). Director, Erindale 4, Ontario, Canada.

CANADIAN Vacation lands: Full price $385.00. 40 acres, $10 month. Suitable cottage sites, hunting, fishing, investment. Free information. Land Corporation, 3768-C Bathurst, Downsview, Ontario, Canada.

CAROLINA Coast. ¼ acre homesites as low as $435.00, $5.00 down, with 10 year, money back guarantee and free life insurance, in a 14,000 acre Paradise in the Pines. 50 fresh-water lakes. 4,000 acre hunting preserve, golf course, country club, shopping center, motel, already built. Only minutes to private ocean beach. For free details write Boiling Spring Lakes, Southport 1-B, North Carolina 28461.

GOVERNMENT Public land in 25 states for individuals as low as $1.00 acre. 1965 report send $1.00, Public Land, Box 22127-K2, Indianapolis, Indiana.

CANADIAN Lands, seized and sold for taxes. Our 48th annual series of lists, describe many choice properties, situated from coast to coast, acquired by us through tax sale. Priced as low as five dollars per acre, guaranteed perfect title, small monthly payments, no mortgage. Beautifully situated hunting and fishing camps, where there is real sport; summer cottage sites, heavily wooded acreages. Now is the time to invest in Canada's minerals, forests and farms. Write to-day for free twenty page booklet with full explanation. Tax Sale Service, Room 301-D, 85 Bloor St., E., Toronto 5, Canada.

400,000,000 ACRES Government public land in 25 states. Some low as $1.00 acre, 1965 report. Send $1.00 National Land, 422PM2, Washington Building, Washington, D. C.

BIG, Free catalog! Bargains galore! Low prices, easy down payments! Safe-Buy Real Estate Agency, 712-PM West Third, Little Rock, Ark.

STROUT Spring catalog—big, free issue. Farms, homes, ranches, vacation, retirement and business opportunities described. Hundreds pictured, Nationwide. World's largest. 65 Years service. Strout Realty, 7-CJ S. Dearborn, Chicago, Ill.; 521-WL E. Green St., Pasadena, Calif.; 311-QE Springfield Ave., Summit, N.J.

MONTANA—18 Tracts from 2½ to 15 acres. Fishing, hunting, cabin sites and campsites on beautiful Yaak River in Montana Rockies; $50.00 down and $25.00 a month. Mountain Empire Company, Box 203-P, Libby, Montana.

FREE! Big illustrated Spring 1965 catalog. Top values coast to coast! Farms, ranches, homes, businesses, waterfront, recreation, retirement properties. United Farm Agency, 612 PM West 47th St., Kansas City, Mo. 64112. PLaza 3-4212.

GOVERNMENT Land available in many states. Some low as $1.00 acre! "Your Opportunities in Government Land" plus "Land Opportunity Digest" with current listings, send $1.00. Land Disposal, 2230-PB Wisconsin, Washington, D. C. 20007.

CALIFORNIA Land for investment. Virgin, undeveloped property still available inexpensively. Write: Sunset Valley, Department L-1, Box 48333, Los Angeles 48, California for details.

$5 MONTHLY Buys 5 acres. Near town, good building site, excellent fishing. Price $125.00. Free list. Box 425-P Carthage, Missouri.

PETS—DOGS, BIRDS, HAMSTERS, ETC.

PETS. Hamsters, mice, rabbits, squirrels, chipmunks, guinea pigs, skunks, raccoons. Picture catalog twenty-five cents. Moore's Hamster Ranch, Shepherdstown 25, West Virginia.

HAWKS, Reptiles, raccoons, skunks, squirrels. Catalogue 25¢. Trails End Zoo, St. Stephen, S.C.

MASSIVE Swiss Saint Bernard puppies. AKC. Schwarzwald Kennels, 5136 Cascade Rd. SE., Grand Rapids, Michigan.

MAKE Money raising chinchillas, mink, rabbits, cavies for us. Free catalog. Keeney Brothers, New Freedom 2, Penna.

RABBITS—FUR BEARING ANIMALS

MINK Raising information free. Lake Superior Mink Farm, Inc., Superior EE1, Wisconsin.

RAISE Rabbits on $500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

EARN $10,000 Yearly raising Angora rabbit wool for us. Information 25¢ coin. American Angora Company, Malta 12, Montana.

RAISE Rabbits successfully by knowing facts. 48 page illustrated book describing 25 breeds. Housing, breeding, feeding, markets, marketing etc. 25 cents. American Rabbit Association, 36 Arba Building, Pittsburgh, Penn.

BOOKS, PERIODICALS, PICTURES, POSTCARDS

BOOKFINDERS! All subjects. Send wants! Sydney Jaher, 175-45 88 Ave., Jamaica, N.Y. 11432.

BOOKS Successfully located! Atlantic Book Service, Cedar Street, Charlestown 29, Mass.

FREE Paperback catalogue. Great savings New York Paperback—Record Club, 4 N. West 43rd Street, New York City 10036.

BOOKS, Free general catalog, 100 pages. Text, vocational, educational, instructional subjects. Millions of volumes, new and used. Bargain prices. Books bought. Est. 1902. Long's College Book Co., Dept. PM, Columbus 1, Ohio.

FREE Catalog. Self-help books. Write Wilshire, 8721 Sunset, Los Angeles 69P.

SAVE To 84% on books. Free Catalogue. Discount Reader's Service, M-5435 Upland Way, Philadelphia 19131.

BOOKS Located free. Large stock all subjects. Send wants. Mrs. F. Myers, Orient, Illinois 62874.

WORLD'S Finest professional magic tricks. Joker's Novelties, Giant illustrated catalog 10¢. Top Hat, Evanston, Illinois.

UNUSUAL Book sale. Discounts up to 90%. Free catalog. F & E Specialties, 1007 Rosecenter, Fenton, Michigan 48430.

FREE Book catalogue. Wolfe, P.O. Box 6625, Phila., Penna. 19149.

Out-Of-print books at lowest prices! You name it, we find it! Fast service. No obligation. International Bookfinders, Box 3003-PM, Beverly Hills, Calif.

NOW Save to 80% on any book. Free details. Braitling, 89-24Y 129 Street, Jamaica, N.Y. 11418.

HOW To retire where you want to without money. Free details. Long, P.O. Box 432B, Penn Yan, New York.

FREE List. Do-it-yourself books. 110 Titles. Verhoff Products, Columbus Grove, Ohio.

BOOKS: Self-Improvement, How To And Home Improvement, Civil Service, Reference, Hobbies, etc. Free literature. J. G. Norcini, 699 N. Wayne Ave., Wayne, Pa. 19087.

USED Correspondence courses and books sold and rented. Money back guarantee. Catalog free. (Courses Bought.) Rodney Mountain, Pisgah, Alabama.

FREE Catalog! Bargain books on self-help, careers, health, hobbies, etc. Write Aladdin, Box 5183, Oakland 5, Calif.

OUT-Of-print books at lowest prices! You name it, we find it! Fast service. No obligation. International Bookfinders, Box 3003-PM, Beverly Hills, Calif.

PROPHET Elijah coming before Christ. Wonderful book free. E. Megiddo Mission, Rochester 19, New York.

MAGIC TRICKS, PUZZLES, JOKER NOVELTIES

COMPLETELY Illustrated catalog, 84 pages, 25¢. Manhattan Magic, Box 334-M, N.Y.C. 11.

2700 NOVELTIES, Tricks, gadgets, jokes, hobbies. Catalog 10¢. Johnson-Smith, D-607, Detroit 48207.

VENTRILOQUISM For fun or money. New method. Easy. Also professional dummies. R. Marlette, 1570 Glen Ellyn Rd., Glen Ellyn, Illinois.

PROFESSIONAL Catalog. 175 pages, 25¢. Williams, 900 Plymouth, Ellwood City, Penna.

NEW Edition, 1965 catalog, 500 tricks, only 10¢. Fastest same-day service to magicians for 40 years. Send 10¢ today. Douglas Magicland, Dept. 21, Dallas, Tex.

HOUSE Of 1000 Mysteries! Giant surprise catalog! 1000 Tricks, jokes, magic! 164 Pages thick! Completely illustrated! Special for Feb., only 10¢. Vick Lawston, Dept. PM25, 4018 N.E. Fifth Ave., Ft. Lauderdale, Florida.

BE A magician! Two booklets explaining sixty-eight tricks plus large professional catalog $1.00. Magic, Inc., 5082 Lincoln, Chicago, Illinois 60625.

MAGIC Catalog! World's finest. 3000 tricks (408 pages) $2.50. Beginners amateurs, professionals. Kanter's. A-200 South 13th St., Philadelphia, Pa. 19107.

GAMES, TOYS, NOVELTIES

WHOLESALE—Tricks, gags, funmakers. Sell friends. Big catalog 50 gag samples 25¢. Dohn-4C-Marks, Broadview, Illinois.

GAMES Inventors! We are interested in new and novel child and adult game ideas. Nationally-known game manufacturing and marketing firm. Send for details. Hagglund and Associates Research, Dept. A, 650 Ottawa Ave. N., Minneapolis 22, Minnesota.

STAMP COLLECTING

FREE Sample. Interesting, illustrated, informative National Stamp News, Anderson, South Carolina 29622.

225 STAMPS For only 10¢! This mammoth value includes airmails, pictorials; stamps from strange countries cataloging up to 25¢ each! Also approvals. Mystic Stamp Company, Camden 80, New York.

SELL Your surplus good grade stamps. Write, describing fully what you have. Vanroy Shirk, Lebanon, Pennsylvania.

60 DIFFERENT U.S. (30 commemoratives) 25¢. No approvals. Seidenberg, Salem 169, Oregon.

AMAZING OFFER! 200 United States stamps—including commemoratives, airmails, high denominations to $1.00. Only 10¢ to approval applicants! Illustrated bargain lists free. Mystic Stamp Co., Dept. 80, Camden, New York.

FREE Monaco nudes. Approvals. Stamp Ranch, 902 Addison, Chicago 13, Ill.

U. S. approvals. Low prices. Eagle Stamps, Romine Ave., Pittsburgh 26, Penna.

INTRODUCING Our better United States approvals we offer 15 United States stamps including Columbian, Bi-Centennials, famous American, airs, others: only 10¢. Ocean Stamps, Box 64-PM, Brooklyn 29, New York.

UNITED States commemorative collection containing 33 different—10¢. Approvals. White, 516-A Avenue L, Brooklyn 30, New York.

UNITED STATES price list, 132 pages, price 30¢. Mark Hanna, 335 Fifth Ave., Pittsburgh 22, Pa.

U.S. Mint specials! Flag set, complete $1.00. 1¢, 2¢, 3¢ famous Americans (21 different) $1.00. Free list. Brooks, 2601 Avenue "U". Brooklyn 29, N.Y.

THOUSANDS Of worldwide sets and singles on approval. Highest quality! Cole, Box 223A, Buffalo, N.Y. 14221.

PENNY! Approvals! Regardless catalogue! Kloster, 4164 52nd St., San Diego 5, Calif.

U.S. Bargain, 50 different 10¢, with beautiful worldwide approvals. Stamps, Kennebunk, Maine.

FREE U.S. catalog, mint Farley Parks #756-65. Rare with gum, $4.00 singles; $15.00 blocks. Simmy Co., 40 Court, Boston, Mass.

GERMAN Commemoratives. 10¢ with approvals. Schaefer, Box 1704, Washington 13, D.C.

FREE Stamp wallet with approvals. Wide selection collections by countries. Clark, Box 28-C, Wilmette, Illinois.

KENNEDY Memorial set. Mint. Colombian multicolored air mail. Pictures late President. Free! With approvals. Philatelics, 78-S, New Paltz, N.Y. 12561.

40,000 DIFFERENT. Amazing new plan builds your collection systematically, country by country. As low as 50¢ weekly. Ware, Monroe 75, Conn.

MILLION Foreign stamps! 2¢ each! Send for thrilling, giant approvals! ABC Stamps, Box 6000-MB, San Francisco 1, Calif.

FREE Surprise collection sent with approvals. Gould, 1784 Union, San Francisco 94123.

1500 FOREIGN $1.00. 5000 $3.00. 5000 USA—commemoratives, airs, high values, revenues, 19th Century, etc. $3.00. No approvals. Meyers, 5321 Fleming, Richmond, California.

ATTRACTIVE Set free. U.S., Worldwide approvals. Gorliz, Drawer 388PS, Park Ridge, Illinois.

20 DIFFERENT U.S. Commemoratives 1893 up 10¢ appr. K&B Stamp Co., Box 70, Bklyn., 23, N.Y.

1025 DIFFERENT Stamps $1.00. Approvals. Klondike, 682 Jefferson, Elgin, Illinois.

105 DIFFERENT U.S. Stamps, 25¢, approvals included. Shelron, Box 187, Hempstead, N.Y.

BREATHTAKING, 50 Mint Monaco pictorials, multicolors. $1.00. Approvals. Stamp Exchange, Box 103, Fairfield, California.

FREE! Giant Bargain Catalog—New Edition listing thousands of bargains including U.S. and B.N.A. stamps, packets, mixtures, albums, accessories and supplies; sent with beautiful approvals. Jamestown Stamp, Dept. E-25PM, Jamestown, N.Y.

WOW! 110 All Different Germany 10¢! Zeppelins, Semi-Postals, Airmails, High values, etc. Giant Catalog, bargain lists included with beautiful approvals. Jamestown Stamp, Dept. A-25PM, Jamestown, N.Y.

CANADA Sports complete 10¢. Canada approvals. Valley Stamps, Little Valley, New York 14755.

50 YEARS Old, fifteen different United States, over fifty years old—10¢ with approvals. Jaxon, Box 145-P, Brooklyn, New York 11230.

PENNY Foreign stamps neatly mounted in jumbo books in Scott order. Bullot approval, 1454 Coney Is. Ave., Brooklyn 30, New York.

ABSOLUTELY Free 50 worldwide. Request inexpensive approvals. University Stamps, P.O. Box 326, Pompano Beach, Florida 33061.

"INVERTED Error," Dag Hammarskjold 5¢ with Approvals. Belmont Stamps, Washington, D. C. 20015.

OLD U.S. space-fillers, ½ Scott. Karl Swartz, Malden Bridge, New York.

200 DIFFERENT Stamps, 25¢. Smith, 508-A Brooks, College Station, Texas.

115 DIFFERENT Plus 17 new African Nations stamps. Many triangles, sets, topicals. Monaco "Chevy," British Colonies, others, 25¢ with approvals. Catalina Stamp, Orange, California.

PENNY Approvals, thousands, 1¢ each. Premiums with purchases. Penny Stamp, Orange, California.

U.S. $$ Stamps free! Columbus issue, Pony Express, Antarctic Territory, Beatles, Togo Kennedy, etc. Send 10¢ for mailing. Empire Stamp Corp., Dept. PM, Toronto, Canada.

WOW! 1000 Different worldwide—valued over $20.00 only $1.00 with quality approvals. Universal, Box 6, Kenosha 5, Wisconsin 53141.

U.S. Stamps. Giant bargain catalog—25¢. Raymax, 35-VR Maiden Lane, NYC 38.

FREE! 25 Egypt, 10¢ handling. Approvals. Bellet, Mapledale, Hazel Park, Michigan 48030.

90,000 STAMPS sale! Generous bargain lot: fine sets, packets, pictorials $1. only. Giant assortment $5. High value packet $3. Rare opportunity for adult collectors. Persile, 436 N.Y. Ave., Brooklyn 25, N.Y.

50 DIFFERENT U.S. Commemoratives 10¢. Approvals. Gordon Davison, Henniker, New Hamp.

CANADA Capex: Trains, stagecoach, beaver only 10¢. Attractive approvals. Rheaume, 6591 11th Ave., Montreal 36, Canada.

215 DIFFERENT Worldwide 25¢. Iceland, French Colonies, etc.! Approvals. Coven's, 6000 Essex Avenue, Springfield, Virginia 22150.

10 DIFFERENT Civil War American and representative confederate stamps illustrated price list 10¢ approvals accompany. Minuteman, 19 Deering, Lexington 73, Mass.

TERRIFIC Value, seven complete sets. 10¢ with approvals. Beatties, Box 16052, Tampa, Florida.

FREE 100 Worldwide with penny approvals. 10¢ handling. Skytop, Box 1022-PM, Binghamton, N.Y. 13902.

12,000 PENNY Approvals waiting for you. Many from exotic countries, pictorials airmails, new issues. Tilbury, Box 862, Newark 1, N.J.

WORLD'S Largest Commemorative! Giant "Brasilia" stamp measuring 2x4½ inches (worth 75¢), plus 10 other mint beauties, only 10¢. Approvals. Arrowhead, 390-A Arlington, Fond du Lac, Wis.

FREE—Mammoth collection, $10,000 airmail, world's smallest stamp, Scott's international, master global albums. Given approval buyers. Bargain Stamps, 1000E. Camile, Santa Ana, California.

STAMP Collecting outfit, includes packet worldwide stamps, nine triangles, two diamonds, new African Nations, topicals, package hinges, watermark detector, Millimeter-perfection gauge. Everything, 25¢ with approvals. Loraine Q. Brown, Marion, Michigan.

SURPRISE Collection! Exotic mint British Colonials, absolutely free with approvals. Viking, Great Neck 8, N.Y.

TOPS! Mystery lot of over 500 different world-wide only 35¢. Tremendous value. Approvals included. Offer to adults only. Littleton Stamp Co., Littleton Q1, N.H.

200 DIFFERENT from 50 countries. Surprises! $1.00. George, 405 Grandview, Clarks Summit, Pa. 18411.

FREE! Gifts to adult collectors! Right now, without obligation, two marvelous Russian sets plus gift coupon with our sensational approval offer. Only 10¢ for handling. Trio Stamps, Box 1806-FM, Grand Central Sta., New York, N.Y. 10017.

BUILD Your collection to any size without duplicates. Club membership plan. Unusual stamps, lowest prices. Details free. Sjoquist, 1435 Cherrydale, San Jose, Calif. 95125.

GIANT Stamp collection including astronauts, satelites, moonrockets, boy scout issue. Complete U.N. set, many olympic & sport issues, etc., plus big stamp dictionary & approvals. Everything, 10¢! Stampex, Box 47-RM, White Plains, N.Y.

100 BRITISH Commonwealth 10¢. Accompanying approvals. Niagara Stamp Co., St. Catharines 501, Ont.

100 DIFFERENT Stupendous worldwide 10¢. Attractive approvals. Linstamps, St. Catharines 401, Ontario.

MAYFLOWER Stamp album 25¢. 407 illustrations. 64 pages. Approvals accompanying. Niagara Stamps, St. Catharines 701, Ontario.

BEAUTIFUL Topical collection includes olympic sports stamps, wild animals, bicolor triangles, colorful birds, outer space stamps, Poland kitten stamp and others. 10¢ with approvals. Sunny Stamps, Fruitport 2B, Michigan.

I PAY $250 each for 1924 1¢ green Franklin stamps, rotary perforated eleven ($2,500 unused). Send 20¢ for large illustrated folders showing amazing prices paid for old stamps, coins, collections. Superb approvals available. Vincent, 85PM, Bronx, New York 10458.

PRICE List, foreign, U.S. No approvals. Stamps, 5000 Miami, St. Louis 9, Mo.

ICELAND 10 Different 10¢ to applicants for our old fashioned approvals. Old Colony, Dept. A, Palmetto, Florida.

COMPLETE Mint olympic sets from Bahamas and Bermuda. 15¢ With approvals. Moumblow, 19 Cedarhill, East Northport, New York, 11731.

12 HITLERS, Mint. 10¢. Approvals. Galleries, Box 35291, Los Angeles 35, Calif.

RUSSIAN Space set 10¢. Russian approvals. Snedco, Box 68-P, Waldwick, N.J.

START Approval business—Details 25¢! Stamps, 116-Pa South Nevada, Colorado Springs, Colorado 80902.

AMAZING Premium! World-wide collection! Over 1,000 different stamps from Aden, Nigeria, Korea, Macao, other exotic lands. Includes triangles, airmails, sport, animal, ship, map stamps. Catalog value over $25.00. This exciting collection given to steady approval customers. Request approvals, details, today. National Coin Brokers, 3774 W. Pacific Coast Hwy., Torrance, Calif. 90505.

FREE B.C. peace set with approvals requested by adult. 10¢ Handling. Student Stamp Co., Charlestown 4, N.H.

FREE! 15 Different mint French colonies plus world's only octagonal stamp to those requesting approvals. W. Cleaveland, 806 North Humphrey, Oak Park, Illinois.

KENNEDY Memorial 1st day cover. Valuable collectors' item! Official first day issue of the John Fitzgerald Kennedy Memorial postage stamp mounted on commemorative envelope bearing portrait of famous President. Postmarked with highly-prized first day cancellation! Also included, to introduce you to the world's most enjoyable hobby: (2) Complete set of 36 U.S. Presidents, (3) Big collector's catalog, (4) Exciting selection of stamps on approval, and (5) "How to Collect Stamps" book. Send only 25¢. Kenmore, Milford KP-780, New Hamp.

FREE U. S. stamps—mint—used. 25¢ handling. Superior, Litchfield, Ohio 44253.

TREMENDOUS Bargain. Forty different packets only $1.00. Norge, Ho-Ho-Kus, N. J.

FREE Mint set! Approvals accompany. Stamps, Box 22092, Memphis, Tenn.

QUEEN Elizabeth on stamps—A beautiful collection of 50 different stamps from 22 countries—all bearing the portrait of the Queen of England. 10¢ with approvals. Roseland Stamps, Spring Lake, 2C, Michigan.

U. S. MINT Parks 740-749 $2.00. Cooper, Box 3751M, Oak Park, Mich. 48237.

STAMPS Free! New issues, new countries, triangles, rockets, Olympics, Scouts, birds, flowers, animals. Also old Canadian and U.S. stamps. Plus complete illustrated Canadian stamp catalog. Send 10¢ for mailing. Gray Stamp Co., Dept. PM, Toronto, Canada.

111 Different Worldwide, specially assembled. 10¢ with unique approvals ½¢ up. Stamp Studio, Box 171M, New York 10024.

60 UNITED States commemoratives before 1948. $1.00. Meland, 141 Holly, Owatonna, Minn.

FREE! 50 Turkey, 10¢ handling. Approvals, Berchtold Stamps, Troy, Ohio.

FREE—Monaco, Israel, Philippines F.C. Approvals accompany. Prall, Hackettstown, N. J. 07840.

10 DIFFERENT Canal Zone 25¢. Approvals! Merkel, 30 Grandview, South Hadley Falls, Mass.

MONACO Bernadette set of three; volleyball, soccer, and four airplane stamps including three diamonds. Also fifty different world-wide. All for 10¢ to approval applicants. Reukauf, 1905 South Cumberland, Park Ridge, Illinois.

FREE First issue from Bhutan, with mint approvals. Alpaughco, Highbridge, N.J.

MONACO 1964 Tokyo olympic games collection & "101 Bonus Sets"—Free with approvals. William Deems, 226b Race, Ravenswood, West Virginia 26164.

260 DIFFERENT U. S. Commemoratives, $2.00. Carstamps, 739 Ordway, Freeport, Illinois.

BEGINNING Collection? Album and 500 fascinating stamps. Only $1.00. Plenty, 541 Everett, Wichita, Kansas.

BULGARIA Trains set (1964). 10¢ with approvals. Martell, Box 421, Westerly, Rhode Island.

BIG Bargain, 50 diffeffrent Israel 25¢. Cornettam, Box 367, Olympia Heights Branch, Miami, Florida 33165.

FREE 25 Rockets to new approval applicants. Tiquet, Box 1496, Denver 1, Colorado.

LIQUIDATION, Everything goes. $2.00 lot includes sets, packets, blocks, sheets. Wallace, Rt. 2, Box 670, North Bend, Oregon.

RARE Stamp free—plus new packet Aden to Zambia with Triangles, Congo Gorilla, Space, Sports, Ships, Togo Kennedy and others. All free. Send 10¢ for mailing. Marks Stamp Co., Dept. PM, Toronto, Canada.

INDIA 50 Different 5¢ approvals, Hijop, Box 505, Norristown, Pa.

50 DIFFERENT Old U.S. Revenue stamps 50¢. Winchester Stamps, 45 Winchester Rd., Mansfield, Ohio.

COINS, TOKENS, CURRENCY

U.S. Coins wanted. Free buying list available. Bedrin, 250 Fulton, Hempstead, N.Y.

10 DIFFERENT Indian cents $2.25. Hutchinson's, Box T-6256, Philadelphia, Penna. 19136.

10 DIFFERENT Lincolns before 1921 $1.00. 20 before 1931 $1.50. Eugene Carlton, Chandler, Okla. 74834.

100 LINCOLNS 1909 up. $4.50. No two alike. Earl Sprague, Kingston Drive, Muskego, Wisconsin 53150.

HIGHEST Prices paid immediately for coins. Send 10¢ for 1965 Buying prices. Wilmot's, 1067 Bridge St., Grand Rapids 4, Mich.

25 BEAUTIFUL Coins from 25 countries. Mostly uncirculated. Terrific assortment. $1.00. Hindley, Box 708, Aurora, Illinois.

UNCIRCULATED 1935 pony express silver commemorative medal $1.00. Coin lists free. Sayers, 1000 Unaka, Johnson City, Tennessee.

RARE Silver Dollars, 1879, 80, 81 S mint $3.00 ea. Uncirculated. New Catalogue, 50¢; Shultz, Salt Lake, Utah 84110.

10 DIFFERENT Indian cents, bargain lists, $2.25. Hobby Sales, St. Paul 16, Minnesota.

BARGAINS—Coins, supplies. Large list, 10¢ (refundable). Ron Farley,Metamora, Illinois.

LINCOLNS! 22 Different "S" including rare 1955S, $1.60. 28 different before 1940 plus 1960D small date, $1.60. Harris, Box 1147, Oceanside, California.

10 INDIANHEADS $2.90; 12 V-nickels $3.15; 10 Morgan dimes $3.50; 10 Morgan quarters $7.50; 10 Morgan halves $12.50. All different! Fairway, 121-M, Rye, N.Y.

COIN Bargains galore. Illustrated lists 10¢ (refundable). Hutchinson's, Box P-6256, Philadelphia 36, Pa.

COIN Investment service. Details, latest report, 50¢. Coins, Box 913G, Port Jervis, N.Y.

TWENTY Page 1965 retail price list of USA and Canadian coins 10¢. Our retail selling prices on thousands of coins and coin collectors supplies. Bryson Incorporated, 612A White, Toledo 5, Ohio.

LARGEST Coin magazine. 288 pages, 50¢. Scrapbook, 7320-J Milwaukee, Chicago 31.

40 PAGE Illustrated United States and Canadian coin list 10¢. Stoney, 260 Washington, Boston 8, Mass.

SCARCE Old United States Coins; 2¢ piece before 1868 $1.75; 3¢ piece before 1870 $1.75; Half Dime before 1860 $1.75. Special All Three $5.00. Rarcoa, 31 North Clark, Chicago 60602.

100 FOREIGN Bills $3.95. 100 foreign coins $2.95. Casper, Box 188M, Tolleson, Arizona.

100 FOREIGN Coins $2.95. 2 Mexican silver dollars $1.00. Kellogg, Box 6350M, Phoenix 5, Arizona.

5—INDIAN Cents $1.00. 5—Liberty nickels $1.00. Doktor, 5028 W. Pico, Los Angeles, Calif. 90019.

COINS Magazine—world's largest seller! Latest coin prices. 25¢ for sample—1 year (12 big issues) $5.00. Water Street, Iola, Wisconsin 54945.

COIN Collectors—"Numismatic News" tells what your coins are really worth. Send 25¢ for sample or $4.00 for next 26 big issues. Water Street, Iola, Wisconsin 54945.

UNSEARCHED Buffalo nickels: 40 $3.40, 400 $28.00. Schubert, Box 230-A, Ithaca, N.Y. 14851.

MAIL Bid sale, coins, addressed stamp envelope. Sprecher, Mount Joy, Pa. 17552.

FREE Catalog shows 34 coin books and supplies. Write, Box 133, Glastonbury, Conn.

NOW! Get 3 real old Lincoln cents! Send 10¢ and receive 1919s, 1910 and 1917. (Only one set to a customer.) Other offers on approval. Littleton Coin Co., Littleton, HI, N.H.

30 DIFFERENT Lincolns special $1.00. Collier Coins, Box 265, Chamblee, Ga.

BRILLIANT Proof sets—1956 $19.50, 1957 $10.75, 1958 $22.50, 1959 $13.50, 1960 $9.75, 1961 $8.25, 1962 $8.25, 1963 $9.75, 1964 $16.00. All nine $112.50. Gigantic bargain catalogue 50¢. Bebee's Incorp., 4514 North 30th, Omaha, Nebraska 68111.

"S" MINT Lincolns! 25 Different—$2.50, 250 mixed—$6.25. Postpaid! Molzan, 3228 Fruitvale, Oakland, California 94602.

TEN Different mint sets or twenty used sets German stamps, $1.00. Dauer, Box 62, Kenilworth, Illinois 60043.

LINCOLNS. Any 3 for $1.00: 1909, 1916-D, 1917-D, 1917-S, 1918-D, 1918-S, 1919-D, 1919-S, 1920-D, 1920-S, 1921, 1925-D, 1925-S, 1926-D, 1928-S, 1928-D, 1931, 1955-S. Al Johnson, 7½ Bijou, Colorado Springs, Colorado.

SAN FRANCISCO Roosevelt dimes, 7 different $2.00. Set Canada pennies 1932 to 1964, $2.00. Tirrell, Box 4469, Riverside, R. I.

FREE Circular. How to order your own coins direct from all foreign mints. Lee Baker Publications, Santa Clara, California.

TWELVE Different Indianheads $3.35; 2-cent copper $1.75; seated half $3.50; bust half $4.35; 20¢ silver $16.75. Free closeout list with order! Nelson, 346-C, Rye, N. Y.

LINCOLNS. 14 Different Denver Mints before 1940 $2.35. 1960d small date uncirculated 65¢. Mickey, Box 82, Brooklyn, 11229.

FREE Coin supplies! Giant coin list 10¢ (refundable). Economy Sales, Mansfield, Massachusetts.

ANTIQUES, RELICS, INDIAN GOODS, CURIOS

SIX Arrowheads from six states, $2.00. George Smith, 9825 Conway Drive, Indianapolis, Indiana 46236.

ARROWHEADS 10 for $3.00. List free. Hyde's, Rosemar Rd., Parkersburg, W.Va.

SELLING 20,000 Ancient arrowheads, spearheads, etc. List free. Lear's, Glenwood, Arkansas.

TONS Of antique gun parts and supplies. All reproduction muzzle loading guns. Send 50¢ for thick illustrated 11th anniversary catalog. Dixie Gun Works, Union City 12, Tenn.

HOBBIES AND COLLECTIONS

EUROPEAN And Nazi uniforms and equipment, medals and badges, all authentic and reasonably priced. Catalog with 600 illustrations $1. Der Alte Oberst, Box 1393, La Jolla, Calif.

50 JUNGLE butterflies $2.00. Giant nature hobbies catalog 25¢. Collectors Wonderland, Box 1170, New York 8.

AMERICAN Newspaper, complete, original, dated before 1880. $1.50. 25¢ stamps brings catalogue. D. R. Spaight, Bookseller Tall Timbers 1, Maryland 20690.

TIME Consuming hobby: Construct mold, create artistic plastic wall panels for every room. Mold print, instructions, $2.00. H. M. Hobrock, P.O. Box #8784, Pittsburgh, Pa., 15221.

FIVE Military emblems and illustrated catalog, 25¢; 30 different 50¢; Foreign medal 50¢; add 10¢ postage. Hobbies, Box 71-M Rockaway 94, New York.

PRECIOUS STONES, MINERALS

SEMI-Precious uncut gems. Ten different for $1.00. Request list 30. Prospectors Shop, 201 San Francisco, Santa Fe, New Mexico.

20 DIFFERENT Worldwide mineral stones with descriptive history. $2.00. Phillips, 1290-P Cottonwood, Banning, Calif.

GOLD. Nuggets. $2.00. Moneyback guarantee. Lea, Box 1125, Mt. Shasta, California.

EARTH Science. Rockhound's National Magazine. Subscription $2.50. Sample 35¢. Box 1357-PM, Chicago 90, Ill.

PHOTO FINISHING, CAMERAS, PHOTO SUPPLIES

A FREE Kodak roll returned with each black and white or Kodacolor developed and printed, fast service, lowest prices, guaranteed quality send for free mailers. Economy Photo Service, Dept. P. M., Box 1111. Albany 1, N. Y.

FAST, Hi-quality finishing. Kodacolor rolls: eight jumbo prints $1.98. Twelve $2.49. Twenty $3.49. Reprints 15¢. Also low B&W prices. Custom Quality Studio, Box 4838, Chicago 80.

AMAZING Values, film users write, Chai Photo Supply Co., 14-03 Berdan Ave., Fair Lawn, N.J.

COLOR Movie Fans! 8 MM expertly processed for just $3.10 including fresh Kodachrome Film. All mailed back next day First Class. Craftsmanship guaranteed. Send exposed reel or request Free Mailers and Price List of complete services. Direct Mail Photo, Box 8352-PM, Pittsburgh, Pa. 15218

PHOTOGRAPHY For pleasure or profit. Learn at home. Practical basic training. Long established school. Free book. American School of Photography, 835 Diversey Parkway, Dept. 3452, Chicago, Illinois 60614.

FREE Illustrated photographic bargain book. Central Camera Co., Dept. 1-B, 230 So. Wabash, Chicago, Illinois.

MOTION PICTURES AND SOUND EQUIPMENT

16MM sound-projectors, films, new, used for sale. Free catalog. National Cinema, 71 Dey Street, New York City, N.Y.

MOVIE Film! Free catalog! ESO-R, 47th Holly, Kansas City 12, Missouri.

5,000 8-16 MM. Movie films. Free catalogues. International, Greenvale, N.Y.

16MM Sound films features and shorts. Bedner, 5300 So. Talman, Chicago.

8MM MOVIES, 2"x2" Color Slides—biggest selection anywhere! World's Fair, railroad, antique automobiles, circus, World War II, Hollywood classics, travel, wild life and many others. 16mm. new, used films also. Big Blackhawk catalog free. Blackhawk Films, 424 Eastin-Phelan Bldg., Davenport, Iowa 52805.

SPECTACULAR Indianapolis "500" 8mm Eastman color film. Runs 20 minutes, includes fiery 2nd lap crash. $11.95 ppd. Sportlight Films, 20 North Wacker, Chicago 60606.

FREE Catalog! Save on 8/mm.-16mm. film and supplies. Superior, 448 N. Wells, Chicago 10.

COLOR SLIDES

RELIGIOUS And travel slides. All shrines. Free catalogs. Argo, Box 714, Manhasset 1, N.Y.

FREE 692 Business opportunities. Hurry. 25¢. Norman, Box 2-R1, Brooklyn 11212.

NEW YORK World's Fair, 1964 exclusive set 100 35mm. 2"x2" color slides, $14.99 plus 28¢ postage. Biggest selection high quality slides available anywhere. Catalog free. Blackhawk Films, 423 Eastin-Phelan Bldg., Davenport, Iowa 52805.

TRANSPARANCIES Wanted, up to $500.00 each: Free report; Camera Arts Exchange, Box 101, Hollywood 28, California.

TRANSPARENCIES Wanted. Up to $500.00 each. For information write American Color, P.O. Box 46372, Hollywood 46, Calif.

BUSINESS OPPORTUNITIES

READ Progressive Mailtrade, the magazine that tells how to make money by mail. Quarter brings sample and special offer. Mailtrade, P.O. Box 357, Sheboygan, Wis. 53082.

COPUBLISH "Mail Sale Advertiser," leading mailorder paper. Copy and details 25¢. Vanroy Shirk, Lebanon, Pa. 17042.

BIG Money raising fishworms and crickets. Free literature. Carter Farms, Plains, Georgia.

$400.00 MONTHLY Raising giant fishworms. Soilless method. Charlie Morgan, Bushnell, Florida.

PLASTERCRAFT Molds, liquid rubber, plasters, flocks, candle supplies. Catalog and manual free. Blue Rapids Supply, Blue Rapids, Kansas.

WORLD'S Largest wholesale supply. Buy from 679 American, European, Japanese wholesalers. Tailormade suits from Hongkong. 123 dropship catalogs. Rockbottom prices. Free details. International Buyers, 216-MM Jackson, Chicago 6, Ill.

WANT To make big money at home? $10.00 profit in an hour possible with invisible mending. Make tears, holes disappear from clothing, fabrics. Steady year-round demand from cleaners, laundries, homes. Details free. Fabricon, 1585 Howard, Chicago 26, Ill.

VENDING Machines. No selling. Operate a route of coin machines and earn amazing profits. 32-page catalogue free. Parkway Machine Corporation, 715 PMB Ensor Street, Baltimore 2, Maryland.

LIQUID Molding rubber, free information, Chaney's, 5415-A San Jose Blvd., Jacksonville 7, Fla.

SELL Champion, AC, Autolite spark plugs. Reconditioned, electroplated, guaranteed 10,000 miles. 100% profit. Free sample. Lee Plugs, 1608-A Roberts, Houston 3, Texas.

OPERATE Home mailorder business. Vosacek Printing, 4444Af Ute, San Diego, 17, Calif.

RAISE Rabbits on $500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

HUGE Profits! Mail order importing. Free information. ITIS-PM-2, Box 454, Hollywood, Calif. 90028.

DOLLS! Dolls! Dolls! We teach you to make, repair, dress and sell. Study at home. Earn while learning. Free booklet. Doll Hospital School, Studio MC-25, 11826 San Vicente Blvd., Los Angeles 49, Calif.

LEARN Landscaping and the growing of plants. Start a profitable business part or full time. Free information without obligation. Lifetime Career Schools, Dept. MC-25, 11826 San Vicente Blvd., Los Angeles, Calif. 90049.

AMAZING Manufacturing opportunity. Free list of manufacturing formulas. Presler Oil Company, Fostoria 16, Ohio.

SPARE Time earnings. With your tablesaw, bandsaw or jigsaw. Write: Workshop, A3800 Harney, Vancouver, Washington 98660.

SELL Advertising book matches. Write us today; we put you in business by return mail, handling complete line ad book matches in demand by every business right in your town! No investment: everything furnished free! Top commissions daily! Superior Match, Dept. MX-265, 7530 S. Greenwood, Chicago 19, Ill.

IMMEDIATE Profits with no capital or experience. Take orders for all magazine subscriptions. Friends and neighbors are your prospects. Write now for complete, free kit. McGregor Magazine Agency, Dept. CB5, Mount Morris, Illinois.

FREE Book "990 Successful, Little-Known Businesses." Work home! Plymouth 872R, Brooklyn 4, New York.

OPERATE Home mailorder business. L&D Printing, 106 Cumberland, Lawrence, N.Y.

SIMPLE, Pleasant, mailorder can net $12,000 year. Write Rutward, 2610 Bryant, Columbia Station, Ohio.

COLORGLAZED Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leaksealing. Money-making projects. Booklet, details free. Men only. National Potteries Company, Grand Rapids, Minnesota.

SELL Books by mail. 400% profit. Royal, Box 450-X, Cleveland 27, Ohio.

FREE Booklet! Profitable, spare-time business bronzing, Pearlkoting baby shoes! Complete set-up on credit. Kiktavi, Box 34861-B, Los Angeles, California.

TO $100.00 weekly! Mailing catalogs! Sample, instructions, 25¢. Costar, GPO Box 972-PM, New York 10001.

BAKE New greaseless doughnuts in kitchen. Stores buy output. Start spare time. Profit 29¢ dozen. Small appliance. Free recipes. Montgomery, 3605 South 15th. Minneapolis 7, Minnesota.

VENDING Machines can make you an excellent spare time income. Small investment gets you started. Write for our free catalogue. Vendall Distributing Co., 1820 E. 38th St., Minneapolis 7, Minn.

STOP Throwing away boxtops! They're worth money! Some, 25¢! Inquire: "Boxtops-MB", Cedar Hill, Texas.

INVESTIGATE Fires, storm damage, accidents for Insurance Companies. Pays up to $1,000 a month, part or full time. No college necessary. Car furnished; expense paid. We train you at home in spare time. Keep present job until ready to switch. Pick your location. Men badly needed now. Full information free. Write Liberty School, Dept. C-511, 1139 W. Park, Libertyville, Illinois.

PROFITABLE Mail order business. Be independent. Details free. Ideal, Box 357-DT, Valley Stream, N.Y.

DIRECT Rock bottom wholesale sources! Buy for pennies! Sell for dollars! Free Details, Joric, Dept. 502, Box 6751, Portland, Oregon 97266.

76 MILLION Prospects! Immediate profits! Selling Champion, AC, Autolite spark plugs. Precision reconditioned, silverplated, guarantee 10,000 miles. Up to 308% profit. Free samples, details. Indy 500 Spark Plug Co., 4620 Braeswood, Houston, Texas 77035.

CONCRETE Facts: Cement Artists make big money. Home Shop—Simple Equipment—Copyrighted Methods and Formulas. Make, Color and Marble Glaze beautiful Cement Pottery without molds. Wishing Wells, Bird Baths, Waterfall, Rustic Garden and Patio items. For free illustrated Brochure, write Hollywood Cementcraft, 602 E. Athens St., Altadena, California 91001.

ESTABLISH Your own home operated, profitable business! Particulars free! MacMillan, 2020-C Marlowe, Lakewood, Ohio 44107.

TINCANS, Sawdust, Newspapers. 200 uses. Instructions $1.00. Charles Company, 42-GPD, Norwood, Ohio.

FREE "Franchise Profit Letter" tells how unique NFR service is helping thousands seeking profitable businesses. Write today. National Franchise Reports, W-528, 333 North Michigan, Chicago 1.

SECRETS! Secrets! Mail order success revealed by internationally famous expert who discovered how to make home business fortunes. Beginners: Get free copy "How to Make Money in Mail Order." Discloses free advertising, profitable products, everything! No obligation. Write Mailco, 1554 Sepulveda, Dept. P-702, Los Angeles 25.

PACKAGE At home for profit! We supply everything. No "selling." Free home business details. HPC, 807HPH Sunset, Los Angeles 12.

REPAIR Hydraulic jacks. Details free. Write: Hydraulic Parts Supply, Box 3645, El Paso, Texas.

FREE Facts and descriptive bulletin. Be an air conditioning, refrigeration, and heating serviceman. High pay, jobs open everywhere, operate your own service business, no school or correspondence necessary. Write Doolco, Trouble Shooter, 2016 Canton, Dallas, Texas.

"MAILORDER — Stop looking!" Get your own catalog! Methods, 1806-FD, Lafayette Hill, Pennsylvania, 19444.

GOLD, Silver, Bronze plastic 3-D products! You produce, profit at home. Fabulous new machineryless method. Free Facts, Nationwide Plastics, Box 23321-GM, Los Angeles 90023.

START Your own business on credit. (U.S. only) Your own boss. Hundreds of dealers making $100 to $300 and more weekly. We supply stocks, equipment on credit. 300 home necessities. Sales experience unnecessary. Pleasant profitable business backed by world-wide industry. Write Rawleigh, Dept. B-U-PPM, Freeport, Ill.

$70.00 WEEKLY—home, spare time. Simplified mail bookkeeping. Immediate income, easy. Auditax, 34741a, Los Angeles 34.

MAKE $46 From square foot plywood: jigsaw necessary. Free details. Woodart, Bridgewater, Mass.

HOME Manufacturing opportunities. Formulas, literature free. Ideal, 179-P, Park Ridge, Illinois.

YOU Can undersell all catalog houses in America! Free details! Cam Company, 436-13 Bloomfield Ave., Verona, N.J.

EARN Money raising fishworms for us! Write: Oakhaven-38, Cedar Hill, Texas.

HAWAIIAN Jewelry sells fast because it is new and exciting. Details free. Chandlers, Wailuku, Hawaii, Dept. 31.

MAKE $50.00 Daily! Sell air operated vacuum cleaners to service stations for $19.50. Your cost $9.50 postpaid. Free details. Inka Industries, 2401 Crocker, Houston 6, Texas.

I MADE $40,000.00 year by mailorder! Helped others make money! Start with $10.00—Free proof. Torrey, Box 3566-Y, Oklahoma City 6, Oklahoma.

SIMPLE Easy methods to secure Civil Service employment. Free details. Cauble's, Box 500, McAlester, Oklahoma.

INSTALL Burglar alarm systems. Big profit home business. Beginners start spare time, without mechanical experience or costly equipment. Free starter plan. Nasco, Dept. P702, 11071 Massachusetts, Los Angeles 90025.

MAILORDER Laws. $2.00. Kalvin Kahn. Attorney. 2020 Chestnut, Philadelphia, Pa.

$200 POSSIBLE Weekly operating Ad Market. Free details. Ad Market, Harlingen 1, Texas.

SIMPLE Guide to better living for Senior Citizens. Free details. Webb, 5431-C, Goodman Road, Merriam, Kansas 66202.

BUILD Custom cases at home for profit. Get orders by mail. We supply materials, instructions, everything. Free home business details. Customcase, 805CPH Sunset, Los Angeles 12.

IMPORT-Export business made easy. Complete setup service; not just instructions. Hermes, 152 West 42, New York City 10036.

IMPORT-Export opportunity, profitable world-wide, mailorder business from home, without capital; or travel abroad. We ship proven plan, for no risk examination. Experience unnecessary. Free details. Mellinger, P702, Los Angeles 90025.

SAVE Up to 90% on brand new books, interesting titles. Free catalog. Embassy, Box 67-A, East Elmhurst, N.Y. 11369.

MAIL Baby catalogs to new mothers for big profits! Details, catalog 25¢. Volz-PM, Ypsilanti, Michigan.

OPERATE Restaurant or diner. Free booklet reveals profitable plan. Write Restaurant Business School, Dept. EC-25, 1920 Sunnyside, Chicago 40, Illinois.

MONEY-Making opportunities galore in a business of your own. Details free. Wilko, 5050-M Windsor, Chicago, Illinois 60630.

"MAILORDER Dollars" Inside facts based on successful experience! Details. Mounier's, 209 Armand, Ville Platte, Louisiana 70586.

HIGH Weekly Earnings. Address-mail letters featuring real merchandise. Receive $10 with every order-keep $8 profit. Supplies furnished. Free particulars. Modern Merchandising, Box 357, Oceanside, New York.

BIG Money—Operate your own fix-it shop. Service all household appliances: irons, fans, refrigerators, automatic washer-dryers, etc. Know how they work, what goes wrong, and how to fix them. Learn how to do house wiring, commercial wiring, rewind motors of all sizes, sharpen mowers, skates, saws. How to get business, buy spare parts wholesale. What to charge for your work. Free Book. Christy Trades School Inc., Dept. A6903, 3214 W. Lawrence Ave., Chicago, Ill. 60625.

HOW And where to raise money. Free details. Kaufman, 12218 Pacific, Los Angeles, California 90066.

SHARPEN And serrate steak knives, scissors, pinking shears, etc., for profit. One low cost machine. Free details. Beaver Machine, Box 121, Gardena, California 90247.

RETIRE Without money. Live happy carefree life. Details free. Facts, 1100-B East Pike, Shinnston, West Virginia.

YOUR Own successful mailorder business. Same methods we use. We establish you. Details $1.00. New World, Box 19, Mesquite, Tex.

$50 PER 1000 possible. Addressing 1000 envelopes. Longhand-typewriter homespare time. Free particulars. General Enterprises, Box 303, Island Park, New York.

NEWSPAPER "Humor column" with your photo, byline attracts attention, sparks sales! Samples, details free. Treasury, 709 Webster, New Rochelle PMX-1, N.Y.

EARN Big money off-season repairing, reupholstering furniture. Enormous year 'round demand. Earn to $5.00 hourly. Husband-wives learn-earn for secure future. We supply everything! Build beautiful furniture while learning. Use home-garage-barn as workshop. No experience or high school necessary. Free book! Modern Upholstery Institute, Box 899-KL, Orange, Calif.

I'LL Send you full-size famous Blair home products for free trial, to help you make more money, spare time or full time. Show friends, neighbors, take easy big orders, make generous profits. Write Blair, Dept. 31BC2, Lynchburg, Va.

SELL Greeting cards, make extra money, all occasion assortments, Easter stationery, gifts, wrapping, toys jewelry. Experience unnecessary. Salable samples on approval. Free Catalog, bonus plan. Write Hedenkamp, 361 Broadway, Dept. CD-1, New York.

OPERATE A home collection agency. Budget, Box 501B, Monterey Park, California.

$25.00-$75.00 Weekly Possible clipping newspaper items. Details free. Graham, 1255-N, Englewood, Colorado 80110.

HAVE $12.000 to $30,000 yearly profits from your own fund-raising business. Choice territories immediately available. Group Counselors, 3010 West Belmont, Chicago 18.

JUST 3 Servicemen bring you $18 hourly profit. Duraclean dealers gross $6.00 hourly each serviceman . . . $9.00 hourly on own service, using national price guide. Quickly learned, easy to do. We show you step by step. Few hundred dollars builds your own nationally advertised business while continuing present job. Operate from home. Start small, grow big in booming business. Investigate immediately . . . before your territory is taken. Free illusrated booklet explains everything. Send for it, then decide. Duraclean, C5-162 Duraclean Building, Deerfield, Illinois.

BECOME Tax consultant. Our students earn $1,000-$3,000 every tax season preparing returns spare-time. Many operate year round business tax service. $10-50 monthly fees. We train—help you start. State approved. National Tax Training School, Monsey, X-2, N.Y.

MAKE $32 From 49¢ piece vinyl. PMA-1834 Edgeland, Louisville, Ky. 40204.

CHECK Protector. Complete bank kit. Write: Goodall, 68-M Joost, San Francisco 94131.

YOUR Own advertising specialty business selling matchbooks, pens, etc. Consolidated, Box 446, Niles, Ohio.

BIG Money selling books, folios, tapes by mail. Daoust Business Research, 3138 Wilson Drive, Chicago, Illinois 60625.

MOLD Statuary, pottery, tiles, novelties —5¢ materials makes dollar sellers! Particulars free. Marbleizing Service, Edwardsville, Illinois.

YOUR Own auto parts business! No investment. Full or spare time. Profit opportunities kit free. C. B. S., Tarentum 25, Pennsylvania.

WORK Home, sparetime. Moneymaking literature, instructions, $1.00. Satisfaction guaranteed! Interstate, 37 Besch, Albany 9, New York.

FINANCE, Loan and capital directory. Free details. National Counselor, Harlingen 17, Texas.

EARNED $3,065 in six weeks on my first campaign. Short course teaches you managing money-raising campaigns for churches, hospitals, institutions. Unlimited field. Thirty years experience. Wm. Arbogast—Publishers, Harlingen 1, Texas.

DROP Ship buyers guide booklet $2.00, write. Reward, Box 605-P, Cooleemee, N.C.

WARNER Plastic laminating press. Arnold Murray, Route 2, Rochester, Ind.

Mail Order opportunity. Details: 25¢. Dmoff, Box 1017, Yakima, Washington.

PROFITABLE Catalog mailorder business! Sample, instructions, 25¢. (Refundable) Vikari's, 468-PM, Third Avenue, Salt Lake City, Utah 84103.

RAISE Cash to start a business—how, where, details rushed — Advisor, Box 48337-F, Los Angeles, 90048.

PROFIT From the sensational new Electro-sonic fish attracting device. Millions of fishermen want it. Direct and mail-order sales aids available. Write Water Wonderland, Box 6312-PM, Detroit, Mich. 48234.

START Home Mail Order business. Bernie Casella, 19 Wordsworth St., East Boston, Mass. 02128.

FREE Informatioon. "Start your own mailorder business today." Mailord Prodcuts, 33-A Groce, Lyman, S.C.

FREE Reports: 609 Unusual, successful businesses. Box 51-PM, Des Plaines, Ill.

AMAZING Success secrets exposed. Proven method. Details free. Motivation, Box 338, Byron, Calif. 94514.

"OPPORTUNITY Knocks." New book. Fifty spare time businesses. $2.00. Brown and Company, 228A East Tenth, Newport, Kentucky.

FREE Report: "87 Successful Mailorder Businesses." Work home. Newsearch, Box 2142-M, Van Nuys, Calif.

LEARN Bonsai! Duplicate exactly $500 imported Oriental Tiny Trees in few hours! Grow living miniatures too; and tiny forests in bowls. Profitable home business! Request free fact pack, free sample seeds! Minitree, Box 23023-RM, Los Angeles 90023.

GO In business for yourself! Directory of 300 franchise opportunities. Free details. Nationwide, Box 266, Lithonia, Georgia.

FABULOUS Profits! Operate successful mail order business. Receive $25 with every order—keep $20 profit. Orders filled Free. Write for details. Home Industries, Box C-13, Atlantic Beach, New York.

PIANO Tuning learned quickly at home. Tremendous field! Musical knowledge unnecessary. Information free. Empire School of Piano Tuning, Box 327, Shenandoah Station, Miami, Florida 33145. (Founded 1935).

MONEYMAKING OPPORTUNITIES

BIG Money raising fishworms and crickets. Free literature. Carter Hatchery, Plains, Georgia.

AMAZING Successes through franchises! Become exclusive franchise holder your territory. Information rushed. National Franchise Reports, WP-528, 333 North Michigan, Chicago 1.

EARN $1000.00 month operating Bookkeeping Tax Service. Details free. Universal Bookkeeping, Box 664, Springfield, Missouri.

MAKE Plastic novelties for extra income. Low cost home training now available. Write for free booklet. Interstate Training Service. Dept. D-3, Portland 12, Oregon.

MAKE Money writing short paragraphs! No tedious study! I tell you what to write, where and how to sell, and supply list of editors buying from beginners. Many small checks add up quickly. Write to sell, right away. Send for free facts. Benson Barrett, Dept. C-27-AA 6216 Clark, Chicago 26.

RAISE Rabbits and fishworms on $500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

START Your own home mailorder business, sparetime! Easy; Fascinating, profitable! Alfano, 19-PM Pine, Closter, New Jersey.

PAINT Signs for yourself—others! Easy with our letter patterns, supplies. Also "Raised Letters." Paulow, Crystal Falls, Michigan 49920.

EARN Big commissions full or part time. Show America's largest line low priced business printing and advertising specialties. Calendars in season. Big free sales kit samples hundred items used daily by business people. Build profitable repeat business. Start right now. National Press, Dept. 19, North Chicago, Illinois.

LEARN The secrets of repairing junk batteries. "Fabulous Profits" at home. Details. Batteryman, Prunedale P.O., Salinas, California.

UNUSUAL Moneymaking opportunities. Free literature. Eaton's, 708PM Gold, Centralia, Wash. 98531.

MAKE Figurines, plaques, lawn ornaments. Molds, plastercraft kits, liquid rubber. Sample and catalogue 10¢. Wooley Company, Box 29-B, Peoria, Illinois.

VENDING Machines. No selling. Operate a route of coin machines and earn amazing profits. 32-page catalogue free. Parkway Machine Corporation, 715 PMM Ensor Street, Baltimore 2, Maryland.

"VACATION With pay." Make money and travel. 100 ways. Details. Trail, Box 415, Abilene 1, Texas.

EXTRA Money making costume jewelry. Easy to make and sell. Beautiful sample kit and catalog, 50¢. Modern Craft, Box 11088-R, St. Petersburg, Fla. 33733 (U.S. only)

MAKE It big! Sell mailorder manuals. Tremendous market, profits. Free details. Rutward Publications, 189 Bryant, Columbia Station, Ohio.

EXTRA Money with mail order and coins. Schiefer, 601 Rawson, Fremont, Ohio.

MAILORDER! $25.00 Orders! Keep $16.67! Distributing $3.25 product. JanMar, Box 572-M, Washington, D. C. 20044.

WE Purchase items you make at home for us. Send stamp for details. Wolfe Specialties, Box 171, Center Line, Michigan 48015.

MAKE Money building pickup campers, covers, trailers. Complete plans $3.95 each. Equipment catalog $1.00 (refundable). Details 10¢. Viking Camper Supply, 94-FC Glenwood, Minneapolis, Minn. 55403.

EARN Money evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle-1, Wisconsin.

BECOME A Notary Public! Win extra income, prestige, business contacts. Details free. Stationers Exchange, P.O. Box 617, Kilgore, Texas 75662.

CIGARETTES. Make 20 plain or filter-tip for 9¢. Factory-fresh pipe tobaccos. Mild tropical flavored Philippine cigars. Facts free. Moberly, Box 904, Owensboro, Kentucky.

HOW I make $50. day operating Ad Market. Free details. David Magee, Harlingen 4, Texas.

FABULOUS Profits raising fishworms. Picture folder free. Excello, Kosciusko 6, Mississippi.

SELL Titania gems: more brilliant than diamonds. Catalog 10¢. Diamonite, 2420-G 77th, Oakland 5, California.

MAKE Money gathering wild roots, herbs, weeds, leaves, tree seeds, flowers, plants! Over 200 varieties! Buyers listed for all you can ship! Easy! Pleasant! World wide! Rush postcard! Allain, 69-P Hollis, Worcester, Mass. 01610.

HANDSOME Profits as finance specialist. Details. Tucker, 3633 Warder, Washington, D. C. 20010.

"HOW I make over $200 a week selling books by mail." Two 5¢ stamps for report. Moneymaker, 722PM2 East Silver Spring, Milwaukee, Wisconsin, 53217.

MAIL Baby catalogs to New Mothers. Big profits. Details, catalog 10¢. Landwehr Enterprises, 154 M Wilmont St., Wethersfield, Conn. 06109.

BIG Money! Independence thru mailorder. Details free. Miller, Box 409, Oroville, California.

CASH Making marble jewelry, flowers. Catalog 10¢. Flocraft, Farrell 43, Penna.

TEAR Out this ad, and mail with name, address for big box of home needs and cosmetics for Free Trial, to test in your home. Tell your friends, make money. Rush name. Blair, Dept. 31BC1, Lynchburg, Va.

MAKE $5,000 Yearly, sparetime, raising mink, chinchilla, nutria, etc. Free booklet reveals proved plans. Write: Furs, 588 Mt. Pleasant Road, Toronto 2, Canada.

WIN Contests. General contest bulletin shows how. Lists current contests and sweepstakes. Sample 25¢. General Contests, 1609½ East 5th, Duluth, Minnesota.

MEN — Women! Start money-making plastic laminating business at home in spare time. Material that costs 11¢ brings back $2.58. No canvassing or selling but mail orders bring in $20 a day. Write for full particulars free. Rush name on postcard to Warner, Room CI-2-A, 1512 Jarvis, Chicago 26, Ill.

IT'S True. It's free. Successful mail order our way. Just write. Worldwide, Box 4026, Station H, Columbus, Ohio.

CASH In on mailorder boom! Combine hobby, profitable business. Facts free. Small, Box 373, Boonton, New Jersey 07005.

$25.00 to $75.00 Weekly possible clipping newspaper items. Details free. Graham, 1255-N, Englewood, Colorado 80110.

EASY To start rubber stamp business at home in spare time. Make up to $9.80 an hour without experience. Facts free. Write Roberts, 1512 Jarvis, Room CR-2-A, Chicago 26.

WIN Cash! 36 pages of contest information. Year's trial, $1.00. Sample, 20¢. Prizewinner, Box 11569, St. Petersburg, Fla.

SLIDEWORD! Cash prize puzzle contest! Introducing the world's first "Teaching Puzzle." Free details. Slideword Puzzle Co., 14270 Mortenview, Taylor, Michigan.

HOW And where capital is available. Free details. Counselor Reports, Harlingen 5, Texas.

CAPITAL Available—ready prime sources, details free. Advisor, Box 48337-E, Los Angeles 90048.

NEED Money? Fantastic mailorder, home business opportunity. I guide you to success. Stamp appreciated. D. Selle, 2942 113th St., Toledo, Ohio.

MAIL Order. No investment advertising. Boon's, Vicksburg, Michigan 49097.

READ Leading mailorder paper. Quarter brings copy. Bycroft, 292 S. Grandview, Los Angeles 90057.

MEN, Women. Earn extra cash! Fascinating home business. Become professional telephonist. Telephonetics, Box 968-PM, Glendale, California 91209.

FREE Information: "Start your own mailorder business today." Mailord Products, 33-B, Groce, Lyman, S.C.

CONTRACTORS: To increase profits request free simplified job costing method outline. Costing division. Consultants to Management, P.O. Box 1002, Menlo Park, California.

10,000 SECRETS, Ideas, for home moneymaking businesses! (Free Brochures) Bertholf's, 739-2 Sylvania Avenue, Toledo, Ohio 43612.

EARN $240.00 a month at home, spare time, doing only two $5.00 invisible mending jobs a day. Big money paid for service that makes cuts, tears disappear from fabrics. Steady demand. Details free. Fabricon, 1532 Howard, Chicago 26, Ill.

START A profitable subscription business in spare time! We need men and women (young and old) as representatives for all leading national magazines. Liberal commissions on all subscriptions. Supplies free. No experience needed. Send this ad with your name and address to: Popular Mechanics, Room 2-O, 250 W. 55th St., New York 10, N.Y.

PROFITABLE OCCUPATIONS

INVESTIGATE Accidents. Earn $750 to $1,000 monthly. Men urgently needed. Car furnished. Expenses paid. No selling. No college education necessary. Pick own job location. Investigate full time. Or earn $8.44 hour spare time. Write for Free Literature. No obligation. Universal, C-PM-2, 6801 Hillcrest, Dallas 5, Texas.

FREE Book "990 Successful, Little-Known Businesses." Work home! Plymouth 87T, Brooklyn 4, New York.

MAKE Money writing short paragraphs. Information free. Barrett, Dept. C-27-AB, 6216 No. Clark, Chicago 26.

WHOLESALE Magazine subscriptions. Highest commissions! Bonus! Box 151AA, Freshmeadows, N.Y. 11365.

BECOME Independent with your own franchise business. Thousands earning handsome incomes. Request interesting facts today. National Franchise Reports, PM-528, 333 North Michigan, Chicago 1.

CHROME Plating. Instructions, equipment and supplies. Platers' Supply, P.O. Box 565, Lugo Station, Los Angeles, Calif.

YOUR Own sign shop—Signs, 1017 W. Mulberry, Springfield, Ohio.

BAKE New greaseless doughnuts in kitchen. Sell stores. Free recipes. Michael, 3605 South 15th, Minneapolis 7, Minn.

RAISE Pheasants on $100 week plan. Little capital and space can make you independent. Free details. Great Central System, Columbus 1, Kansas.

BIG Money raising fishworms and crickets. Free literature. Carter Wormery, Plains, Georgia.

EARN $240.00 A month at home, spare time, doing only two $5.00 invisible mending jobs a day. Big money paid for service that makes cuts, tears disappear from fabrics. Steady demand. Details free Fabricon, 1586 Howard. Chicago 26, Ill.

AUCTIONEERING—Resident and home study courses. Auction School, Ft. Smith, Ark.

NEW Amazing portable 49¢ meal. Selected by U.S. Olympic team. Sparetime distributors and area wholesalers wanted. Send $1.00 for three meals. Comidex Corporation, New Canaan 9, Connecticut.

SHARPEN—Scissor, pinkers, skates. Inexpensive machines, supplies. Blackhawk's, Sheldahl, Iowa.

"HOME Profits" mail sales. Write. Humphreys, 3210 Purcell, Grand Prairie, Texas 75050.

BIG Money, in spare time business. Free details: Worldcraft, Greenhills 6723, Nashville 12, Tenn.

LEARN Inventing for profit or hobby. Write: Dar-Cee Products, Box 178-PM, Salem, Wisconsin.

MIRACLE Chemical turns grease into dollars! Just demonstrate amazing Fabulene to Industry. Dissolve oil, grease, grime, carbon from machinery, floors, tools, metal, cars. Fireproof! Safe! Make $28 per sale plus automatic repeat profits. Start spare time. No experience needed. Write for free details to Elgene Chemicals, 925 Old Nepperhan, Dept. M-2, Yonkers, N.Y.

NEW Guide! Exceptional vocational opportunities. Homestudy. Free details! Aureaw, Allenhurst, New Jersey.

VENDING Machines. No selling. Operate a route of coin machines and earn amazing profits. 32-page catalogue free. Parkway Machine Corporation, 715 PMP Ensor Street. Baltimore 2, Maryland.

START A magazine subscription business. Earn generous commissions on Popular Mechanics, Good Housekeeping and all others. Best commissions, bonus, all material sent free. No experience needed. Write Popular Mechanics, Room 2-P, 250 West 55th St., New York 19, N.Y.

AGENTS WANTED

MAKE Up to $50.00 daily soliciting delinquent accounts. Terrific commissions. General Finance Co., Dept. LG-75, Pickwick Bldg., Kansas City, Mo. 64106.

PRINTING. Advertising salesmen—Excellent moneymaking sideline selling decalcomania name plates, small quantities. Automobile initials, sign letters. Free samples. Ralco, XL, Boston 19, Mass.

YOUR Own business—Used suits $1.50; overcoats 65¢; mackinaws 35¢; shoes 12½¢; ladies coats 30¢; dresses 15¢. Enormous profits. Catalog free. Nathan Portnoy Associates, 2109-AA Roosevelt Road, Chicago 8, Ill.

ESTABLISH Your own business. Low prices on used clothing, shoes, household goods. Unlimited profits. Free catalog. Northwestern Distributors, 2129 No. Western Avenue, Chicago 47, Illinois.

MEN! Women! Big profits on cosmetics. Famous nationally advertised Hollywood Cosmetics pay big. Make $25 day up. Hire others. For free samples, details, write Studio Girl, Glendale, California, Dept. OP337.

MEN! Women! Big profit on cosmetics. Famous nationally advertised Hollywood cosmetics. Make $25 day up. Hire others. For free samples, details, write Studio Girl, Glendale, California. Dept. OP337.

SELL To gas stations! New windshield cleaning product. Big dozen, jumbo sized plastic bag full of heavy duty urethane foam cleaners, sells on sight. Cuts service time, saves paper towels. Price $2.00. Your cost $1.00. Make $50 a day. Details, refundable sample order, $1.50 postpaid. Kwik Products, Dept. I-M, LaGrange, Ga.

SELL Greeting cards, make extra money, all occasion assortments. Easter stationery, gifts, wrappings, toys, jewelry. Experience unnecessary. Salable Samples on approval, Free catalog. Bonus Plan. Write Hedenkamp, 361 Broadway, Dept. CD-1, New York.

SEEKING New products? Get my outfit 47 money-making specialties. Latest conveniences for home, car. Send no money. Just your name. Kristee, 141, Akron, Ohio.

MAKE As much as $100. a week selling quality all occasion cards, gifts, novelties, stationery. Write for samples on approvals. Robinson Cards, Dept. 617, Clinton, Mass.

EXTRA Paycheck$ every week! Make big money spare time or full time with famous Mason Shoes. No investment. Top profits. Write for free business kit. Mason, Chippewa Falls K-508, Wisconsin.

AGENTS—300% Profit selling genuine gold window letters; stores and offices. Free samples. Metallic Sign Letter Co., 1217-D West Newport, Chicago.

EXTRA Cash aplenty! Show 'em and you'll sell 'em—sensationally beautiful, handpainted plastic photo enlargements, personalized compacts, costume jewelry. Take orders—collect 40% commission. Self-selling sales kit free. Novelco, 3343 North Avenue, Chicago 47.

SALESMEN Make big profits selling "do-it-yourself" sign kits to merchants. Information free. Signmakers, Inc., Dept. PM4, Box 6626, Denver 16, Colorado.

RAISE Rabbits for us on $500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

SALESMEN—DISTRIBUTORS

SELL Advertising book matches. Write us today we put you in business by return mail; handling complete line ad book matches in demand by every business right in your town! No investment; everything furnished free! Top commissions daily! Superior Match, Dept. M-265, 7530 S. Greenwood, Chicago 19, Illinois.

EARN Big commissions full or part time. Show America's largest line low priced business printing and advertising specialties. Calendars in season. Big free sales kit samples hundred items used daily by business people. Build profitable repeat business. Start right now. National Press, Dept. 18, North Chicago, Illinois.

$1,000.00 a month for making dramatic 3-second demonstration of amazing Lightweight Presto Fire Extinguisher. New chemicals used by Airforce snuffs out fires instantly. Only $4.95. Terrific commissions. Millions want it. Free Kit. Merlite, 114 E. 32nd, Dept. P-66F, New York 16.

SENSATIONAL New longer-burning light bulb. Amazing free replacement guarantee—never again buy light bulbs. No competition. Multi-million dollar market yours alone. Make small fortune even spare time. Incredibly quick sales. Free sales kit. Merlite (Bulb Div.), 114 E. 32nd, Dept. C-73F, New York 16.

SELL Business cards. Unlimited market. 20% Commission. Catalogue $1. (Refundable!) M T L Printing, Box 947, Chicago, 60690.

MAKE Big money taking orders for stark Dwarf fruit trees. Everybody can now grow giant size apples, peaches, pears, in their yards. Also shade trees, shrubs, vines, roses, etc. Outfit free. Stark Bro's, Desk 30125, Louisiana, Missouri.

FREE To salesmen who want more money. Send name, age and occupation for free copy Opportunity Magazine describing 200 new, fast sellers. Entirely free. Opportunity, 850 N. Dearborn, Dept. 17A, Chicago, Illinois 60610.

JOIN Nation-wide Market Testing Organization! Products supplied on consignment. Sell first—Pay later. Details: $1.00 (Refundable). Volz-MT, Ypsilanti, Michigan.

LONG Needed invention. Man to contact service stations. Huge profits. Cyclo Mfg., 3816 Dahlia, Dept. 101, Denver 1, Colo.

WILL You test new items in your home? Surprisingly big pay. Latest conveniences for home, car. Send no money. Just your name. Kristee, 161, Akron, Ohio.

HELP Wanted full or part time. Every business buys printing, business forms, advertising specialties. Big cash profits—$5.00, $10.00, even $100.00 per order. No experience, no investment. Everything furnished Free. Write Kaeser, 953 Martin Place, Dept. D-59, Cincinnati 2, Ohio.

GET New shirt outfit free! $90 weekly on 5 average orders a day. Famous quality made-to-measure dress and sport shirts at $4.50 up, sell to all men. No experience needed. Full or part time. Write: Packard Shirt Co., Dept. 212, Terre Haute, Indiana.

EARN Cash commissions plus free gifts. Sell matchbook advertising. Sales kit furnished. Matchcorp, Dept. PM-25, Chicago 60632.

MAKE Money selling ties, readyknots, regulars, slims, personalized ties with any name. Free literature. Philips Neckwear, 22 West 22nd, New York.

ASTONISHING Automatic toilet bowl cleaner, deodorizer. Works when toilet is flushed. Housewives buy on sight for every bathroom, at only $1.98 each. Make up to $10.00 in hour, spare time. Free sales kit. Merlite, 114 East 32nd, Dept. G-71F, New York 16.

EARN Money part or full time distributing top quality line of home products. Send $1.00. Newman, P.O. Box 214, Wayzata, Minnesota.

SEAMLESS Nylons first quality $4.75 dozen. Lizmar, 10409 St. Clair, Cleveland 8, Ohio.

DISTRIBUTORS Wanted. Stainless razor blades. Buhl, Box 34, Princeton, Florida.

EMPLOYMENT INFORMATION

TREMENDOUS Opportunities—U.S.A.—Overseas—choose jobs—locations—transportation—free details. Occupations, International Airport, Box 100-C11, Jamaica 30, N.Y.

FOREIGN Employment. Construction, other work projects. Good paying overseas jobs with extras, travel expenses. Write only. Foreign Service Bureau, Dept. PM, Bradenton Beach, Fla.

DIRECTORY Of foreign-U.S.A. job possibilities. Most occupations. Up to $1600.00 monthly. Often free transportation. Benefits. Money back guarantee. Send $1.50 ($2.00 airmail). International Employment, P2, Box 22038, Indianapolis 22, Indiana.

JOBS, Ships. $100.00 weekly. Beginners, men, women. Information. Seamans Service, Box M, New York 21, N.Y.

MERCHANT Marine. Men, women, ships and boats. High wages. Travel. Captain, Box 501-P, Reading, Massachusetts.

FOREIGN U.S. employment: Big constructions, other work projects. All trades. Salaries up to $1,600. monthly with travel expenses and extras. Write only: Foreign U.S. Employment Bureau, Dept. D-30, 142 High Street, Portland, Maine.

JAPAN! Korea! Okinawa! Many jobs available. Complete, detailed reports, satisfaction guaranteed. $3.00. Japan Reports, Newport Beach, California.

HAWAII, Is Your Future In. Booklet. Covering "working to surfing." $1. International Business Consultants, Ltd., 1305 Ala Moana Bldg., Honolulu, Hawaii, 96814.

FOREIGN—U.S.A. High-paying, steady employment. All occupations, professions. Transportation. Family relocation. Sixth successful year providing fast, direct placement. Global, Box 286-A, Oroville, California.

MEN, Women needed for Civil Service employment. Write: Employment Opportunities Service, P.O. Box 3392, Youngstown 12, Ohio.

BOOMING Australia needs your skills! Government-assisted passage, if qualified. Details $1.00. Frank Klein, 2913 Chestnut, Costa Mesa, California.

CALIFORNIA Is for you? Act now—100 pages of factual information. $1 ppd. Majestic, 332 M-1 Westway, Orange, California.

DIRECTORY Reports. Construction, aviation, shipping, oilfields, government, manufacturing, trucking, etc. foreign—stateside. Helpful information plus job-getting tips on preparing application letters. Unconditional money-back guarantee. Only $3.00 ($3.25 airmail) Research Services. Box 6768-PM, St. Louis, Missouri 63144.

MUSIC AND MUSICAL INSTRUMENTS

GUITAR, Banjo Making books, Plans, woods, necks, tools. List 15¢. Satinwood, 510 East 11th Street, New York 9, N.Y.

ACCORDION-O-RAMA, 874 Broadway, New York 3, N. Y. Tremendous discounts. Top brands. Free brochure.

POEMS Wanted for musical setting and recording by America's largest song studio. Send poems. Free examination. Five Star Music Masters, 6-M Beacon. Boston 8. Mass.

SONG Ideas wanted. Write with active professional songwriters with publisher contracts. Records made. Share royalties. Send ideas—free examination. Songwriters' Associates, 236 W. 55th, N.Y. 19-P.

ITALIAN Accordions Manufacturing, 6343P, So. Ashland, Chicago 36, Illinois. Piano, Chromatics, Hohners, Concertinas. Wholesale catalogs free.

PIANO Self-Teaching Book. Includes popular, classical, harmony, theory, chords, scales. Price $5.00. LaPont Publishing Company, Box 606-P, Franklin, Michigan 48025.

USED Professional guitars, amplifiers, drums. Hills, 3526 California, Peoria, Illinois.

PLAYER Piano books. Free catalog. Vestal Press, Vestal 11, N.Y. 13850.

SONGPOEMS Wanted. Send poems. Free examination. Hollywood Song Productions, 10885 Los Alamitos Blvd., Los Alamitos, California.

SONGPOEMS Wanted. Send poems for offer. Nashville Music Institute, Box 532-PM, Nashville, Tennessee.

RECORDS! Discounts on all LP's. Free details. Citadel Record Club, 545 Fifth Ave., Dept. 2, New York 17, N. Y.

POEMS Wanted for musical setting and recording. Send poems. Free examination. Crown Music Company, 49-C West 32 Street, New York 1.

ACCORDIONS, Guitars, band instruments! Save ½. Famous makes, free home trial. Easy terms. Trades. Free discount catalogs. Mention instrument. International Music Mart, Dept. R, 5535 Belmont, Chicago 41.

2500 UNUSUAL Hobby, party records, others; free catalogue. Record Suppliers, 300 Chelsea, Louisville, Kentucky, 40207.

ELECTRIC Guitar kits, patterns, parts. Kits, 3526 California, Peoria, Illinois.

SONGPOEMS Wanted: Collaborate with professionals. Share royalties. Hollywood Music Productions, 6425-B3, Hollywood Blvd., Hollywood, Calif.

SONGPOEMS Wanted! Collaborate with professional songwriters equally. Share royalties. Songwriters Contact, 1619-D, Broadway, New York 19.

SONGS And song poems wanted. Royalties. Tin Pan Alley, Inc., 1650 Broadway, New York, N. Y. 10019.

ELECTRIC Guitars, amplifiers, wholesale. Free catalog. Carvin, PMM, Covina, Calif.

RADIO, TELEVISION AND ELECTRONICS

33¢ RADIO & TV tubes. Free list. Cornell, 4213-17 University, San Diego 5, California.

BRAND New tubes. World's lowest prices on radio, TV-industrial, special purpose tubes. Write for free parts catalog. United Radio., Newark, N.J.

SAVE Money on TV and radio repairs. Free catalog. Telefixit, Box 714, Manhasset 1, N.Y.

FREE Tape Recording Handbook. Money-saving prices. Pofe Electronics, 1716-PM Northfield, Muncie, Indiana.

GOVERNMENT Surplus electronics, infra-red equipment. Catalog 20¢. Meshna, Nahant, Mass.

$1.00 DELIVERS plastic packets for 60 QSL's. Tepabco, Browne Blvd., Gallatin, Tennessee.

RECORDS To tape: Free tape. William Baumann, 557 No. 17th Street, Milwaukee, Wisconsin 53233.

FREE Electronics catalog. Tremendous bargains. Elecrolabs, Department C-618B, Hewlett, New York 11557.

WALKIE-Talkies communicate with friends and business associates. Great for hunting and boating. Ideal for police, fire dept., construction and services. Range to 5 miles. Buy the best for less. Write for free details now. Sheirr Electronics Lab., 1422 Tamarind Ave., Los Angeles, Calif. 90028, Dept. S.

HOW To succeed in broadcasting, $1.00; radio, advertising, communications. Box 3364, Anaheim, California.

TRANSISTOR Radios repaired: $5.00 covers repairs, return postage. Guaranteed. Mail radio, $5.00 to: Quick T.V., P.O. Box 8758, Pittsburgh 21, Penna.

FREE Sample two transistor logic module. Send 25¢ for mailing. Answers #15, 4513 Clara St., Bell, Calif. 90203.

LASER Hobbyists, experimenters, amateur scientists. Build your own coherent-light optical laser. Complete instructions, schematic diagrams and parts list, $6.00. Same as above, diode laser, $3.00. Technical Writers Group, Box 5501, State College Station, Raleigh, N.C.

TAPE Recorders, hi-fi components. Sleep learning equipment, tapes. Unusual values. Free catalog. Dressner, 1523 Jericho Tpke, New Hyde Park 3, N. Y.

SCIENCE & CHEMISTRY

ROCKETS: New illustrated catalog 25¢ Single and multistage kits, cones, engines, launchers, trackers, technical information, etc. Fast service. Estes Industries, Penrose 7, Colorado.

ILLUSTRATED Catalog: Chemistry, mineralogy, biology 25¢. Tracey Laboratories, Evanston, Illinois.

UNDERWATER Fuse 3/32" diameter, 25 feet $1.00 postpaid. Rigley, Box 138-F, Addison, Mich.

CHEMICALS, Apparatus, Biology. Catalog 35¢. Mid-States Scientific, 7053 N. Clark, Chicago, Ill.

ROCKETS! Flight kits, testing equipment. Catalog 25¢. Rocket Development Corporation, Route 3, Seymour, Indiana.

FREE. Science fair catalog. Chemicals, glassware, physics, biology. Frey Scientific, 465 S. Diamond, Mansfield 1, Ohio.

LIQUID Fuel rocket. 10 lbs. payload to 6000 ft. complete plans only $2.98. Missile Research, 517 Elder, Anaheim, California.

FREE Fuse! Split giant logs Easily! Details 20¢. "Nitropower" B-1701 Altadena, California 91002.

CHEMISTRY Catalog still 25¢. Free kit offer details. Laboratory Sales, Box 161-A, Brighton 35, Mass.

MATHEMATICS: Problems worked — $3.50. Papers written—$7.50. Any mathematical subject. DECA, Box 229, Lubbock 8, Texas.

AMAZING New book of science experiments, formulas, and catalogue of laboratory supplies. Only 35¢. National Scientific Co., 13 So. Park Avenue, Dept. PM-2, Lombard, Illinois.

FORMULAS, PLANS, ETC.

FOR Proof of what you can do in specialty manufacturing get our literature. It's free! Miller, Chemist, 1517-P, Tampa, Florida.

LATE, Modern manufacturing formulas. List free. Moon Chemical, Martville, New York.

FREE Folders fully describe our many hundreds of formulas and plans for homework and profitable small-business enterprises. Western Chemicals, Box 19718-C, Los Angeles 90019.

SKYROCKETS, Firecrackers, fireworks —Make your own! 60 simple formulas 1.00. Paloma Pyrotechnics, P.O. Box 247, Auburn 3, California.

10,000 MODERN Moneymaking Formulas. Details free. Graham's, 1255-F, Englewood, Colorado 80110.

PROFITABLE Manufacturing formulas. Literature free. Pontesso, Idaho Station, Terre Haute, Indiana.

FORMULAS—All kinds. Amazing big catalog, 10¢. Kemixal, Park Ridge, Ill.

PLASTICS

NEW Liquid casting plastic clear colors. Embed real flowers, butterflies, photos, coins. Send 25¢ for two handbooks, "How to Cast Liquid Plastics" and "How to Make Extra Money at Home." Castolite, Dept. 101B, Woodstock, Illinois.

PLASTIC Embedders, jewelry workers. We have everything. Findings, moulds. New catalog 25¢. David Co., 20 Garden St., Dept. M, Providence 3, R.I.

NEW! Pressure sensitive plastic laminating machines. Supplies, details. Burr, 7645 Oakland, Kalamazoo, Mich. 49002.

VACUUM Molding—packaging. Scout Emblems. Hughes, Box 224, Tipp City, Ohio.

BOXES, Plastic. 200 sizes. Free list. Althor, 2260 Benson Ave., Brooklyn, N.Y.

EXPORT — IMPORT

JAPAN: Mail-Order 26 page catalog, dolls, novelties, Manufacturers' names, addresses $1.00; 1000 products illustrated trade directory $3.00. Send cash. Yamagata Office, 814 Togin Bldg., Marunouchi, Tokyo.

100 NAMES Of foreign exporters! Send $3.00 to Dumit, Box 3314, Scottsdale, Arizona.

BUY IT WHOLESALE

BARGAINS! Buy wholesale! Save money! Free catalog! Norris, 273-VG Merrick, Lynbrook, N.Y.

FREE! Name brands catalog! Your own high profit business. Sell name brands, full or part time. No inventory, no investment. More than 2,000 name brand items; lowest wholesale prices. Watches, jewelry, cameras, hi-fi, stereo radios-phonos, appliances, housewares, hardware, power tools, luggage, musical instruments, garden equipment, sporting goods, toys, many others. 8 floors of name brands. Million dollar inventory. Orders shipped complete in 24 hours! Send for free, beautifully illustrated catalog now! Separate wholesale price list. H. B. Davis Corp., Dept. PM, 145 W. 15 St., New York 11, N. Y.

USED And new watches $2 up. Free list. Southern Watches, 5-PM So. Wabash, Chicago 3.

100,000 PRODUCTS Wholesale! Terrific bargains! Wholesalers, 1265-MR Broadway, New York, N.Y.

WORLD'S Largest wholesale supply. Buy from 679 American, European, Japanese wholesalers. Tailormade suits from Hongkong. 123 dropship catalogs. Rockbottom prices. Free details. International Buyers, 216-M Jackson, Chicago 6, Illinois.

ELECTRIC Guitars, amplifiers, wholesale. Free catalog. Carvin PMW, Covina, Calif.

YOU Can undersell all catalog houses in America! Free details! Cam Company, 436-08 Bloomfield Ave., Verona, N.J.

400,000 ITEMS Free brochures. Pat, 270 E. 60th St., Hialeah, Fla. 33012.

TRAIN Set—$1.36, recorders—$6.70, pistols — $5.74, binoculars — $1.20, radios, watches, rings, cameras. Typical import prices. Buy from 685 American, European, Japanese wholesalers. Exciting details free. Enterprises, Box 160-X8, Jamaica 30, New York.

FREE—Bargainhunters wholesale catalog. Sensational, moneysaving. B. Raney, Box 223, Levittown, New York.

BUY Wholesale—sell retail, 900 Items. Free catalog. Department Forty, 100 North Greene Street, Baltimore, Maryland.

1964 DODGES, Fords $999.00. Free catalog. Autos, 273-JI Merrick, Lynbrook, New York.

NEW 6-color deluxe below wholesale catalog. Automobile catalog and others. Furniture, clothing, housewares, appliances, refrigerators, freezers, washers, dryers, televisions, radios, luggage, binoculars, hi-fi, stereo, phonographs, recorders, cameras, projectors, musical instruments, sporting goods, toys, tools, typewriters, watches, jewelry. Huge discounts on thousands of name brand items. For free specimen list of actual factory prices—postcard: Selbyco —5, Decatur, Illinois.

SPECIAL SERVICES

PORTABLE Cases—sales, demonstration, utility. Manufactured your specifications. Free estimates. R. Durst, Waynesboro, Penna.

PROTECT Your eyes! Corrected curve, first quality Case hardened lenses ground to your prescription by New York State licensed Opticians. Deal directly with optical laboratory established 25 years. Mail your eyeglasses or prescription for reasonable quote, also regular spectacles and sunglasses. Global Opticians, 16 East 23 Street, New York City.

DESIGN And drafting services. Highly qualified personnel. Buschle, Centre, Alabama.

SAVE 50 to 75% or more on eyeglasses to your own doctor's prescription. Single vision lenses, frame and case, $9.95 complete; with bi-focal lenses, $13.95. Nothing else to pay. Mail orders filled by qualified skilled opticians. All lenses manufactured and ground to U.S. Optical Standards. Send today for Free Circular showing variety of frames for men, women and children. Professional Optical Service, 180 N. Wabash Ave., Dept. 510-A, Chicago, Ill. 60601.

LOCATING Service! Any items or product. Jake Barraco, 478 Gardner, South Beloit, Illinois.

EDUCATIONAL AND INSTRUCTION

MEN Wanted. Earn $125 a week and up. Master a trade with a future. Learn auto diesel mechanics in our shops. You learn with tools on real equipment. Earn while you learn. Many of our graduates earn $125 a week and up. Write for free bulletin: Dept. 256, Auto Diesel College, Nashville 3, Tenn.

AIRLINE Careers. Adventure! Prestige! Four-week course, men 18-35. Airline-trained teachers. Free placement service. 21st year. Catalog B. McConnell Airline School, 1030 Nicollet, Minneapolis, Minnesota.

LEARN Asleep or awake! Records, tapes, equipment! Free catalog! Drawer PM-697, Ruidoso, New Mexico.

BOOKKEEPERS. Operate your own "Dollar-A-Week" system. Ellis, Box 200, Cedar Grove, North Carolina.

PIANO Tuning pays. Big money in spare time. Learn at home. No musical knowledge necessary. Phonograph, records, tools and instructions furnished. Electronic tuning also taught. Free catalog. Capital Tuning School, 3160 S.W. 16th Court, Ft. Lauderdale, Fla.

MISSOURI Auction School. Free catalog! 1330-03 Linwood, Kansas City, Mo. 64109.

WANT A diesel career? Higher pay? Advancement? We can help you qualify! Complete diesel, tractor and heavy equipment and Cummins diesel engine shop-method home-training courses available. Write today. Interstate Training Service, Dept. B-3, Portland 12, Oregon.

USED Courses! Books! List 10¢. Smith's, 124 Marlborough, Salem, Mass.

FCC License in 6 weeks. First class radio telephone. Results guaranteed. Elkins Radio School, 2603D Inwood, Dallas, Tex.

WOODWORKING And cabinetmaking course for beginning and advanced home craftsmen. Only complete low-cost home training program available. Write for free booklet. Interstate Training Service, Dept. G-3, Portland 12, Ore.

OWN Collection agency. "Little Gold Mine!" Franklin Credit, Roanoke, Virginia.

HOW To train horses. A book everyone who likes horses or ponies should have. Free. No obligation. Simply address Beery School, Dept. 1102-C, Pleasant Hill, Ohio.

SPEAK. Sing with power. Self-training records. Canfield, 2018-A Fifth Avenue South, Minneapolis 4, Minnesota.

SWEDISH Massage and Physical culture pays big profits. Learn at home. Diploma. Free catalog. National Institute, Dept. E25, 307 North Michigan, Chicago 1.

LEARN Auctioneering. Term soon. Free catalog. Reisch Auction College, Mason City 1, Iowa.

NEW Experimental offer, limited time. Learn special investigation, free information. International Academy of Police Science, Box 314, Oklahoma City, Oklahoma.

AUTOSUGGESTION, Sleep-learning headquarters! Tapes, records, books. Gigantic catalog free. Research Association, Box 24-PM, Olympia, Washington.

SECRET Investigations. Experience unnecessary. Investigators particulars free. George Wagner, M125 West 86th, New York 24.

MONEY BACK GUARANTEE—C.I.S.T. —The World Wide Institute of Home Study —34 global centres—260 courses—Engineering, Electronic, Academic and Commercial—send for your FREE 100 page copy of 'Career Opportunities' today—No salesman will call. C.I.S.T., 624 Garden City Building, 263 Adelaide St. W., Toronto, Canada.

DETECTIVE Training. Robert B. Phillips, Sr., Founder. Former Govt. Special Agent. For free information write to 1917F North Kenneth Ave., Chicago, Ill.

LEARN Technical metaphysics—The ancient masters method of healing. Easy to learn, inexpensive. For free details write to: Premier College of Technical Metaphysics, P.O. Box 95, Ucluelet, B.C., Canada.

PIANO Tuning quickly learned with home study course. Diploma granted. American Tuning School, Gilroy, Calif.

LEARN Civil and criminal investigation at home. Earn steady, good pay. State age. Institute Applied Science, 1920 Sunnyside, Dept. 162, Chicago 40, Illinois.

BE A real estate broker. Insure security for yourself and your family. Study at home. Prepare for state examination. Write for free book today. Weaver School of Real Estate, 3519-P Broadway, Kansas City, Mo. 64111.

DETECTIVE Training, home study, credentials. Civil Investigative Training, P.O. Box 249, Lockhart, Florida.

ATTEND The nation's finest. Write Galion Welding School, Galion, O.

MASTER Watchmaking at home. Free sample lesson. Chicago School, Dept. YO, Fox River Grove, Illinois.

INVESTIGATOR'S Course. Credentials, diploma. Free information. Southwestern Institute Criminology, Box 201, Geronimo, Oklahoma.

SWEDISH Massage. Foot technique. Post graduate. Home study, Residential. Diploma. Dr. Swanson's Illinois Licensed School, 3809-PL Alta Vista, Chicago 13.

USED Correspondence courses and books sold and rented. Money back guarantee. Catalog free. (Courses bought.) Lee Mountain, Pisgah, Alabama.

PENMANSHIP Book, "ornamental and business writing." Improve poor handwriting quickly. Details free. T. Tevis, Chillicothe, Mo.

"STAMMER—Stutter—no more." (Dr. Young.) Write: Gaucho, Box 9309-S7, Chicago 90.

WRITE For money—free confidential directory of magazines that pay big for jokes, recipes, etc. Writing ability unnecessary. Cash in spare time or become full-time writer of stories, articles, television scripts, etc. Palmer Institute, 941-AZW, North Highland, Hollywood 38, California.

CIVIL Service study guides list, dime. Armstrong, Box 387, Kent, Wash.

OIL Coloring photographs—A fascinating hobby or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Free book. National Photo Coloring School, 835 Diversey Parkway, Dept. 3432, Chicago (60614).

GAME Warden, Government hunter, Forestry, Park and Wildlife Services announce job openings regularly. Enjoy outdoor work, good pay, real security. Complete information free! Write North American School of Conservation, 941-AZW North Highland, Hollywood 38, California.

BECOME High-paid electronics technician, or broadcasting engineer—correspondence; resident classes. Free details. Write: Dept. 7, Grantham, 1505 N. Western, Hollywood, Calif. 90027.

DRAFTING Pays big money. Learn at home in your spare time! Revolutionary new method. Exciting work in world of tomorrow wide open opportunity. Own your own drafting firm. Draftsmen needed everywhere. Train for a dynamic future in the fields of mechanical, architectural, machine, aeronautical drafting. Send for Free Book, "A Successful Future." Christy Trades School, Inc., Dept. D-7803, 3214 W. Lawrence Avenue, Chicago, Illinois 60625.

HIGH School at home in spare time with 68-year-old school. No classes. Standard high school texts supplied. Single subjects if desired. Credit for subjects already completed. Progress at own speed. Diploma awarded. Information booklet free. Write today! American School, Dept. X245, Drexel at 58th, Chicago 37.

HIGH School diploma at home. Licensed teachers. Send age, highest grade completed for free detail. No salesman will call. Southern States Academy, Professional Bldg., Dept. 16, Decatur, Ga.

BUDGET—Instructions, forms, get on cash basis, prevent quarrels and divorce. $1.00. Homer J. McOmber, Flanagan Hotel, Malone, N.Y.

PROFITABLE National Camera Repair School training at home! PM5, Englewood, Colorado.

AIRLINES Need young men for communications, operations, reservations. Big pay—opportunity for advancement to supervisor and executive positions. High School graduates 17-38 learn if you qualify. For free facts write now—give age, education, phone. Weaver Airline Personnel School, 3521-A Broadway, Kansas City, Mo. 64111.

RADIO And electronics course only $14.95. Includes all tubes, parts, instructions. Write for free brochure. Edu-Kits, Department 617-B, Hewlett, New York 11557.

MINISTERIAL Home study course. Free qualifying examination. Soma, 5955 Powdermill Road, Kent, Ohio.

LEARN While you sleep. Scientific methods, free catalog. Apex, Box 1033, Littleton, Colorado.

GRADUATE From high school at home. Diploma awarded. Information free. Midwestern School, Box 782, Skokie, Illinois.

SLIDEWORD! Cash prize puzzle contest! Introducing the world's first "Teaching Puzzle." Free details. Slideword Puzzle Co., 14270 Mortenview, Taylor, Michigan.

DRAFTING Illustrated Correspondence School, First Lesson $2.00, basic course $50.00. 471 E. Wood Rd., Rockville Centre, N.Y.

DRAFTING, Blueprint reading. Schematics. Send $2.00 first lesson. Complete home course $25.00. Prior Inc., 23-09 169 Street, Whitestone 57, New York.

COMPUTER Careers offer high pay. Learn Fundamental Computer Math. (Language of Computers). Home study course only. High School required. Catalog free. Technical Crafts, 29 Peachtree Place, Atlanta, Georgia 30309.

LEARN To drive tractor-trailer, trucks, buses. Short concentrated courses available. Write for free brochure. Driver Training Institute, 794 Bedford Ave., Brooklyn, N.Y. JA 2-5080

LEARN Fascinating, profitable Invisible Reweaving at home. $10.00 earnings in an hour possible making tears, holes disappear from clothing, fabrics. Steady demand from cleaners, laundries, homes. Details Free. Fabricon, 1534 Howard, Chicago 26, Illinois.

GRAPHOANALYSIS — Learn scientific handwriting analysis for profit, pleasure. Free sample lesson, catalog reveals plan. Write IGAS, Inc., 325 Jackson, Dept. 2AW-2, Chicago 6.

PENMANSHIP Corrector. Improve poor penmanship quickly. Details free. Ozment, Box 665-34, St. Louis 88, Mo.

PLAYS, STORIES, MANUSCRIPTS

WANT Your book published? Learn how we publish, advertise, promote, distribute. Many successes. Free booklet PM, Vantage, 120 West 31, New York City.

ADVERTISING AGENCIES, ADV. SERVICE, MAILING LISTS

FREE! Redhot book, "More Profit From Your Advertising." Includes best mailorder magazines, newspapers. Adservice, 11730 NW 22B Court, Miami, Florida 33167.

MAILING Lists most all kinds 1000 $5.00. Free folder. Your circulars mailed $4.00 1000. Dixie Mailers, King, N.C.

ADVERTISING Ratebook leading newspapers, magazines, free. Chicago Advertising Agency, 28-E Jackson, Chicago 4.

ADVERTISE Your business on postcards, brochures, posters. Lithographed in natural color. Sample, details free. Litho-Press, 1500 W. Dakota, Denver, Colo. 80223.

MAILORDER Record Book. 30 pages. Records inquiries, orders, advertising expense, etc. Most complete. Just send dime for postage and handling. C. A. Martin, Popular Mechanics, 575 Lexington Ave., New York, N.Y. 10022.

TYPEWRITERS, DUPLICATORS, OFFICE DEVICES

PHOTO-Copiers, typewriters, mimeographs. Free catalog. James Stationery, Waverly, Ohio 45690.

ADDING Machine, 7 columns, $14.95 postpaid. Free brochure. Add-Kraft, Box 92, Delmar, N.Y. 12054.

TYPEWRITER Bargains. List 10¢. Columbus, 719 East Pike, Seattle, Washington 98122.

5-COLOR Duplicators—postcard to legal size, $16.95 up. Free pricelist. Johnson 215-P East Severn, Shawnee, Okla.

OFFSET, Letterpresses, varitypers, typewriters, mimeograph, multigraph machines. Bargains. DixieGraph, King, North Carolina.

RUBBER STAMPS AND OFFICE SUPPLIES

RUBBER Stamps, 3 lines, $1.50. Free catalog. Tabco, Tomkins Cove, New York.

STAMPS, Business cards, stationery embossers. Evero, Box 9233, Phoenix, Arizona 85020.

FREE 32 Page rubber stamp catalog. Signature stamps $3.50. Youngers Stamp Shop, Princeton, Iowa.

FREE Catalog, office supplies, rubber stamps. Stamps, Box 5711, Denver, Colorado 80217.

THREE Lines $1.00. Cushion mounted indexed R. Creed, Upton, Mass. 01568.

POCKET Rubber stamp in metal case $1.75. Three lines copy. Case contains self-inking pad. Same stamp, plastic case $1.00. Clayton Company, 509—21st Avenue, San Francisco, California 94121. P.S.: 1,000 3-line name and address labels in unusual plastic case $1.00.

FREE Catalog: Rubber stamps, printing. Dowling Products, Dept. PM25, Pittstown, N.J.

CATALOG: Rubber stamps, daters, printing. Martin, 1425 Major, Jefferson City, Missouri 65101.

HARD Type for rubber stamp making and printing, free catalog. Barco Type, 237 S. Evergreen, Bensenville, Ill.

POCKET 3 lines $1.00. Office stamps $1.50. Free catalog. Specialty, 8464 Manhattan. Detroit, Mich. 48211.

CARTOONING, COMMERCIAL ART, SHOWCARD & SIGN PAINTING, TATTOOING

SIGN Painting. Fascinating system. Straley, 410 South Western, Springfield, Ohio.

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 92, Pleasant Hill, Ohio.

LEARN Sign painting at home. Free talent test. Ben Kerns, Box 812-PM, Greenville, S.C.

LEARN Profitable magazine cartooning. Free details. Hartman, Box 3097, Lincoln 10, Nebraska.

LIKE To draw? Splendid opportunities in professional cartooning. Write for free catalogue. No obligation. National School of Cartooning, Studio-H, Box 8958, Cleveland 36, Ohio.

"SIGN Lettering tricks" (deluxe edition) $1.00. Speedy methods. Details free! Harris, P.O. Box 1567-F, Portland, Oregon 97207.

LEARN Cartooning. Fascinating course. Cartoons, 1017 W. Mulberry, Springfield, Ohio.

PAINT Signs! Using patterns! Trial alphabet $1.00. Harwell's, PM-265, Byrdstown, Tennessee.

SIGN Painting. Instructions, brushes, equipment. Free catalogue. Kaufmann Supply, Centertown, Missouri.

YOU Can entertain with chalk talks. Catalog 10¢. Balda the Cartoonist, Oshkosh, Wis.

PRINTING, MULTIGRAPHING MIMEOGRAPHING GUMMED LABELS

250—8½x11 HAMMERMILL Letterheads $2.75, 250 envelopes $2.75. Samples. Patton, Box 248S, South Haven, Mich.

PRINTING—8 Page Catalog—1½¢ Free Price List. Kopen, 288 Atlantic Avenue, Brooklyn 1, N.Y.

FREE Gift with 1000 executive embossed business cards. $4.49. Samples. (other printing bargains). Weaver, Dept. 115, 3524 Northeast 118, Portland, Oregon 97220.

BUSINESS Printing. Catalog free. Bill's Press, 538-P Leffingwell, Kirkwood, Missouri 63122.

PHOTO-Offset printing. Free samples. Litho, 113 Prindel, Smyrna, Tennessee.

HIGH Quality printed envelopes; thermographed business cards; Rubber stamps. Free price lists! Griffin, 322-PM West State, Ithaca, New York 14850.

OFFSET Printing postpaid up to fifth zone. 1000 8½x11 20 lbs. bond $6.00. Write for price list. Biscayne Products, Box 346, New York 5, New York.

1000 BUSINESS Cards, executive embossed, $4.50 postpaid. Jesco, Box 1081, Auburn, Alabama.

QUALITY Printing, lowest prices, samples. Dowling Products, Dept. PMP25, Pittstown, N.J.

OFFSET Printing 500 8½x11 copies $3.00 postpaid. 48 hr. service. Cisco Duplicating Service, Atlanta, Illinois.

100 8½x11 copies: Printed forms, typing, drawings $2.20. F.O.B. Oliverprint, Romeo, Michigan.

1000 EMBOSSED Business cards $3.98 delivered. Many others. Guaranteed. Bixley, 752 Benson, Frankfort, Kentucky 40601.

AMAZING Business printing values. Samples. Print Shop, Box 576, Greenville, R. I.

PRINTING & RUBBER STAMP OUTFITS & SUPPLIES

90% PROFIT Rubber stamps. Complete outfit, $99.95. Duckman, Avoca, Ark.

DO Your own printing. Save money. Simple rules. We supply everything. Print for others; good profit. Raised printing like engraving too. Have home shop. Details free. Kelsey Presses, V-11, Meriden, Connecticut.

PRINTING Presses, type, supplies, lists 5¢. Turnbaugh Service, Mechanicsburg, Pa.

RUBBER Stamp outfits, supplies. Kiewiet, 2025 Barney Road, Kalamazoo, Mich.

MAKE Your own self-molding rubber stamps and printing cuts. Plexirubber, Argyle 1, Wisconsin.

ALL $1.00—Stamps with handles, 1 to 5 lines, to 3 inches long. Postpaid. 42 Type choices. Brewer, Box 3098, No. Ft. Myers, Florida.

TYPE And supplies for rubber stamp makers. New wholesale price list No. 3 free. Star Stamp Supply, 732 Federal, Chicago 5, Ill.

RUBBER Stamp presses, hydraulic operated, electrically heated. Sizes 5″ x 8″, 8″ x 12″, 10″ x 15″. Starting outfits, supplies. Printing presses. Type cases and cabinets. Custom Manufacturing, 1464-P East Commercial, Springfield, Missouri.

FOR INVENTORS

INVENTORS: Your ideas and inventions (patented; unpatented) expertly searched and developed for commercial appeal and cash/royalty sales to manufacturers by professional Invention Developer with excellent record of experience. B.S., Industrial Engineering; U.S. Patent Office former Patent Examiner; U.S. Government former Patent Adviser. Second decade of reliable service! Free "Invention Record" and Important Information. Airmailed! Write: Raymond Lee, Invention Developer, 1606N Bush Bldg., New York City 36.

PATENT And invention development, by licensed professional patent engineer and U. S. Patent Office former examiner, and engineering specialists. Your inventions and ideas engineered for patent protection and commercial value. Inventions developed by us negotiated for cash or royalties with our nationwide contacts. Send for free protection "Invention Certificates" and further interesting, valuable patent information. George Spector, Licensed Professional Patent Engineer, Woolworth Building, New York.

BETTER Patent services: profit from patents with good sales values and effective market protection by patent. I help inventors to have both at low definite fees: free self protecting forms give you security in disclosure; patents filed for $200.00 up; foreign patents filed at very low cost. Forty years successful practice. Joseph O'Brien, Patent & Development Engineer, R 1127, Munsey Building, opposite U. S. Patent Office, Washington, D.C. Patent searches made for $7.50, with references.

PROFESSIONAL Patent searches, $6.00, including official U.S. Patent Office copies of related U.S. patents! Prompt, dependable service. Certified, airmailed! For free "Invention Record Folio" and important patent information every inventor should have, write: United States Inventors Service Company, 1311 "G" Street NW, Washington 5, D.C.

SAVE High fees! Prepare your patent application yourself! New "Do-It-Yourself" patent kit now makes it easy! Free "Registration Form." Miss Blaine, 306A Carry Building, Washington 5, D.C.

PATENT Searches, including copies of related U.S. patents, $6.00. Inventors, attorneys, manufacturers use my "worldwide" airmail service! "Invention Record" form and "Information Every Inventor Needs," sent free! Miss Hayward, 1029P Vermont, Washington 5, D.C.

INVENTIONS Needed immediately for manufacturers. For additional information write Kessler Corporation, C-51-FI, Fremont, Ohio.

INVENTORS: Save time and money. Prepare and file your own patent application. Our complete "Patent Kit" makes it easy. Includes detailed instructions and all necessary material. Only $14.75. Money back guarantee. Don't delay. Send check or money-order today to National Inventors Service, 1244—19th Street, N.W., Washington, D.C.

AMAZING Manual; how to protect, sell and finance inventions. Excellent results. Galleon, P.O. Box 409, Back Bay, Boston, Mass. 02117.

THERE'S A fortune in ideas! Companies need ideas—sell them yours. Directions, protective contract—complete, $1.00. Thousands successfully satisfied. Promotion Products, Dundee 1, Ill.

PATENT Searches—48 hour airmail service, $6.00, including nearest patent copies. More than 200 registered patent attorneys have used my service. For free invention protection forms, write Miss Ann Hastings, P.O. Box 176, Washington 4, D.C.

INVENTORS—Do you want to sell or license your invention on cash or royalty basis? Write: Kessler Corporation, C-52-FI, Fremont, Ohio.

INVENTIONS, Patents, new ideas. Central Trust Company, 4344 East Indian School Road, Suite 4, Phoenix, Arizona.

U.S. Patent Office Searches, 234 Broadway, Room 3615, New York. Free invention certificates.

INVENTIONS WANTED

INVENTIONS Wanted. Patented: unpatented. Tremendous manufacturers lists. Global Marketing Service, 2420G 77th, Oakland 5, California.

INVENTORS—If you have an invention for sale, patented or unpatented, write for free brochure outlining manufacturer's requirements, Royalty rates. Kessler Corporation, C-58-IW, Fremont, Ohio.

INVENTORS We either sell your invention or pay you cash bonus, write for details. Universal Inventions, Marion, Ohio.

IF Your invention is adaptable to promoting we will contract for selling on cash or royalty. Free booklet outlines royalty rates, requirements. Kessler Corporation, C-52-IW, Fremont, Ohio.

INVENTIONS, Patents, new ideas. Central Trust Company, 4344 East Indian School Road, Suite 4, Phoenix, Arizona.

INVENTORS Wanted: Manufacturers need new items! Your inventions, ideas developed for cash/royalty sales. Free "Invention Record": Information. Raymond Lee, 1606P Bush Building, New York City 36.

MANUFACTURING

WIRE Forming progressive dies, send print, part sketch, short run turning. B. L. Tool & Die, 413 26th St., Union City, N.J. B. Lindberg, prop.

FOR Inventors. Model building. Manufacturing. Any quantity. Research. Forging and plastic dies. Injection molding. Top consultants in all fields immediately available. In the heart of technical New England since 1942. William Parker, 32 Westminster, Worcester, Mass. 01605.

MODELS — Small lot manufacturing. Metals, plastics, etc. Milburn, Burlington, Kentucky.

MODELS—SHIPS, TRAINS, PLANES, ETC.

ROCKETS: New illustrated catalog 25¢. Single and multistage kits, cones, engines, launchers, trackers, technical information, etc. Fast service. Estes Industries, Penrose 2, Colorado.

SHIP Model kits and fittings: clippers, frigates, etc. Catalog paint-tool list, book list, 35¢. Model Shipways, Box 85, Bogota, N. J.

LIONEL Trains bulletin 10¢, catalog 25¢. Mack Bros., 2043 Chicago Ave., Chicago 60622.

SHIP and yacht model fittings; Pine construction hull kits; blueprints. Send 50¢ for illustrated catalog. A. J. Fisher, Inc., 1002 Etowah Avenue, Royal Oak, Michigan. 48067.

SHIP Models. Kits, fittings, plans, books, tools, engines, motors. Big illustrated catalog 50¢. James Bliss & Co., Dept. SM, 342 Atlantic Avenue, Boston 10, Massachusetts.

LIVE Steam models. Castings and machined kits. Marine, walking beam, mill engines, boilers. From $7.45. Pictured catalog 50¢. H.P.K. Models, Box 34, Centuck Station M, Yonkers, New York.

BUILDING Materials—¼" & ⅛" scale windows, doors, siding, roofing, lumber and structural shapes. Send 35¢ for catalog with samples. Small Sales Co., 8008 Floyd Dept. PM, Overland Park, Kansas.

POWER Models—Large selection steam, gasoline engines, boilers, books, fittings, metals, hexagon head bolts, nuts. Complete set drawings La France Fire Engine. Catalog #19, $1.00. Cole's Power Models, Centura, Calif.

TRAIN Bargains: 25¢ brings catalogue of 2000 Gilbert, Lionel, Atlas, etc. Bargains—all gauges. Also Strombecker, Aurora, Eldon and other slot racer parts. Hobby Surplus, P.O. Box 1106M, New Britain, Conn.

HOME CRAFTSMEN

FREE! Big 80 page Leathercraft catalog. 100's of new items! MacPherson Bros., Dept. K, 730 Mission St., San Francisco, Calif. 94103.

SKIL-CRAFTS New '64 catalog. Largest and finest selection of leathercraft, artist, hobby-craft supplies in the world. Free gift with first order. Send 50¢. Refundable with first order. Skil-Crafts, Box 105-P, Joplin, Missouri.

WOODWORKERS — Home craftsmen! Catalog containing lamp parts, veneers, lazy susan bearings, Swiss movements, chair cane, folding metal legs, wooden legs, mouldings, furniture hardware, finishing materials, etc., only 15¢. Barap Specialties, Box 2044-BW, Chicago 60609.

WALNUT, Cherry, silver maple, gun stocks, squares lumber, picture frame moulding. Midland Lumber Company, Box 262, Savannah, Missouri.

2512 PLANS, Patterns, things to make, do. Fun. Profit. World's greatest selection. New catalog 10¢. Craftplans, 18250-A Harwood, Homewood, Ill.

PLANS, Bird houses and feeders. Illustrated catalog 25¢ coin. F. Yeager, 1665 Linden Road, Homewood, Illinois.

FREE "Do-it-yourself" Leathercraft catalog. Tandy Leather Company, Box 791E53, Fort Worth, Texas.

PICKUP Camper, trailer or pickup-cover—build yourself, save! Complete plans $3.95 each. Equipment catalog $1.00 (refundable). Details 10¢. Viking Camper Supply, 94-FB Glenwood, Minneapolis, Minn. 55403.

UNFINISHED Picture frames—moulding too! All original patterns. Catalog 25¢. Japs, 126-P Seventh North, Hopkins, Minnesota.

101 PATTERNS Of smart gifts, novelties, shelves, action windmills plus "Make Money Jig Sawing." $1.00. Mastercraft, 25M, 7041 Olcott, Chicago 31.

FREE Car coat. For accepting no-risk Trial of our Duwel Sabre-jig saw. Details free. Fingerhut Manufacturing, Box 1041, St. Cloud 1, Minnesota.

WALLPAPER, Save half or more. New 1965-66 catalog. 188 Selections 18¢-69¢ single roll. Send 10¢ catalog mailing. Mutual Wallpaper, Dept. PM, 228 West Market, Louisville, Kentucky 40202.

WOODWORKING Catalog and manual 25¢. World's most beautiful veneers, lumber, plywood! Wood finishing, upholstery supplies. Furniture hardware. Tool bargains! 2,000 needed workshop products. Constantine, 2051-B, Eastchester Road, Bronx 10461.

PLANS For pool table with extra two-face top for table tennis and model railroad. Blueprints B1209 and building instructions $3.50. Popular Mechanics Service Bureau, 575-M Lexington Ave., New York, N.Y. 10022.

DO IT YOURSELF

BUILD Your own pickup camper, cover, trailer. Save! Complete plans $3.95 each. Equipment catalog $1.00 (refundable). Details 10¢. Viking Camper Supply, 94-FD Glenwood, Minneapolis, Minn. 55403.

PAINT Your own wall mural! Inexpensive, easy paint-by-numbers pattern kit includes oils, brushes—everything! 35 decorator designs. Color catalog 10¢. Muralart, 6816-AZ Romaine, Los Angeles 36.

HEAT Home from your hot water tank, thermostat controlled, quiet, safe, clean, economical, easily installed. Complete plan, instructions $2.00. Heart Heating, 3761 Promontory St., San Diego, California 92109.

EXERCISE At home on build-it-yourself physical fitness equipment, including bicycle exerciser, rowing machine, belt massager, and abdominal board. Send $2.50 for blueprints B1208 and instructions. Popular Mechanics Service Bureau, 575-K Lexington Ave., New York, N.Y. 10022.

FREE Check-list covering more than 300 classifications of projects, plans, instructions, service and repair information detailed in Popular Mechanics famous series of instructional booklets, books, patterns, and blueprints. List covers an extremely wide variety of do-it-yourself data on home remodeling, repair and improvement, hobbies, crafts, boating, games, lawn and garden, and hundreds of others. For your free copy of this helpful list, write: Service Bureau, Popular Mechanics, 575 Lexington Ave., New York 22, New York.

FOR THE HOME

GARAGE Door screen complete in package 8'x7' $19.95, 16'x7' $39.50. Send money order or cash. Stachura Co., 2494 Seneca St., Buffalo, N. Y.

WATCHES, OLD GOLD, JEWELRY

WATCH And clock repairing books. Free catalog. North American, Box 77-AB, Fox River Grove, Illinois.

HIGHEST Cash for gold, teeth, jewelry, rings, diamonds, watches, silver platinum. Mail articles today. Free gift with information. Chicago Gold & Precious Metals, 6 E. Monroe, Dept. 1658, Chicago 3.

CASH Immediately for old gold, jewelry, gold teeth, watches, diamonds, silverware, spectacles, platinum, mercury. Free information. Rose Industries, 29-A East Madison, Chicago 2.

WANTED, Gold, silver, platinum, scrap (any form), coins. Information free. Wilmot's, 1067 Bridge St., Grand Rapids 4, Michigan.

OF INTEREST TO WOMEN

WOMEN! Make big money at home. $10.00 profit in an hour possible with invisible mending. Make holes, tears disappear from clothing, fabrics. Steady year-round demand from cleaners, laundries, homes. Details free. Fabricon, 1533 Howard, Chicago 26, Illinois.

DOLLS! Dolls! Dolls! We teach you to make, repair, dress and sell. Study at home. Earn while learning. Free booklet. Doll Hospital School, Studio MC-25A, 11826 San Vicente Blvd., Los Angeles 49, Calif.

MAKE Big easy profits making costume jewelry at home in spare time! Quick, easy to make; easier to sell! Details free! Don-Bar, 2934 Fullerton, Dept. B-205, Chicago 47, Illinois.

NYLOLACE 40 yards $1.00. Buttons 800—$1.00. Schaefer, Drummondville, Quebec.

FREE Recipe. World's best fried chicken. Recipes, Box 7149, Oakland, California 94601.

ESTATE Diamonds, Rubies, Sapphires, Opals, Gemstones, Free Catalog. Klar Jewelers, National Bankers Life Building, Dallas, Texas—Established 1904.

TREASURE FINDERS

POWERFUL Metrotech locators detect gold, silver, coins, relics. Moneyback guarantee, terms. Free information. Underground Explorations, Dept. A, Box 793, Menlo Park, California.

GOLD, Treasure, coin locator $2.00 complete. Guaranteed. Treasures—3, Ashland, Oregon.

NEW Supersensitive transistor models detect buried gold, silver, coins. Kits, assembled models. $19.95 up. Underwater models available. Free catalog. Relco-A40, Box 10563, Houston 18, Texas.

TREASURE Hunters, prospectors, beachcombers; pin-point exact location buried coins, relics, gold, silver with powerful metal locators. Free literature. Write: Goldak, Dept. B-2, 1544 W. Glenoaks, Glendale, California 91201.

TREASURE, Gold, silver relics. Find them with new 1965 models. Free information. Rayscope, Box 715, North Hollywood, California.

TREASURE Metal detectors most complete line in U.S.A. Free catalog. Bill's Service Center, Box 1, Paramount, California.

GOLD And silver indicator $15.00. Literature free. Geo. Simpson, 18788 Cajon Blvd., San Bernardino, Calif.

FIND Underwater placer gold, $1000's recovered. 100 page handbook shows how, where. $3.00. Back Country Bookstore, Box 866AF, Tarzana, California.

EXCITING Adventure locating hidden loot, treasure, relics, etc., with powerful, electronic M-Scope locator. Lightweight. Guaranteed. Very easy terms. Send for free booklet, interesting customer reports. Fisher Research, Dept. AY, Palo Alto, Calif.

TREASURE. Find gold, silver, relics with super, powerful Detectron locators. Free information. Detectron, Dept. 2-PM, San Gabriel, California.

METAL Locator kits and assembled models from $39.90. Terms. Transistorized models available. Free catalog. Electronic Applications. Dept. M, Box 6095, Alexandria, Virginia.

SAVE! Build transistorized treasure finder. Details free. Del Research, Box 147-B, Alden Manor, Elmont, N.Y.

NEW. Coin locator! Free literature! Howe, 811-C Kansas, Atchison, Kansas.

REMAILING SERVICE

MIAMI Remails 20¢. Monthly rates. Marle, Box 1266, Coral Gables, Florida.

SECRET Mail receiving system. Hedgpeth, 406-M South Second, Alhambra, California 91802.

SECRET Mail! Confidential service system! Cox, 84 Chestnut, Saugus, Massachusetts 01906.

CONFIDENTIAL New York City mail address $3.00 month. Remails 25¢. Details free. Birnhan, 152 W. 42, New York City 36.

LOS ANGELES, Hollywood, San Fernando Valley—25¢ single; $3.00 monthly. Confidential, 10437 Lanark Street P, Sun Valley, California 91352.

HAWAII Secret unadvertised address. Remails 25¢. Receiving-forwarding $3.00 monthly. Postcards. Souvenirs. Coe, Box 984, Kailua, Hawaii 96734.

SECRET Mail receiving system. Details free. Mihm's, 1110-E South Barrington Avenue, Los Angeles 90049.

REMAILING 25¢. Monthly $3.00. Details free. Cooper, 1902 Good Hope Rd., S.E., Washington, D.C. 200-20.

SECRET Receiving and remailing. Discreet and confidential. Remail 25¢ single. 8050 S. Main, Houston, Texas.

ROCKY Remailing, monthly $3.00, remailing 25¢. RPM, Box 179, Hayden, Colorado.

NASSAU, Bahamas prompt remails $1.00. Parker, Box 60-9, Miami, Florida 33160.

CHICAGO Area remails 25¢. Monthly $2.50. French, 815 E. Oakton, Des Plaines, Illinois.

NEW MEXICO! Flawless system. Remails 25¢-$3.00. Free details. Jetstream, Box 11456-PM, Station E, Albuquerque.

REMAILS. Tampa 25¢. St. Petersburg-Clearwater 50¢. Monthly rates—839 S. Blvd., Tampa, Fla.

FACTS, Any subject—product. Research, surveys, special assignments, reports. Information 25¢. Box 1431, Greenville, South Carolina.

REMAILING 25¢. Monthly $3.00. Details. Acosta, Box 4327, Tampa, Fla. 33607.

REMAILING 25¢. Monthly $3.00, immediate reply. Henry, Fairground Station, Box 6344, St. Louis, Mo.

FOREIGN Remailing, postcards, special services. Worldwide, Box 1736, Denver 1, Colorado.

CAPE Kennedy remails $3 month. Hensen's, Box 628, Cocoa, Fla.

INTERNATIONAL Remailing. Domestic 25¢. West, 226-P Spruce Drive, Wilmington, N.C. 28403.

PERSONAL

BIBLE Questions answered. Stamped envelope. Bylon, 17167 Bentler, Detroit, Michigan 48219.

SUBCONSCIOUS Conditioning remakes personality while you sleep. Free details. Sleep-Learning, Box 24N, Olympia, Washington.

HOME I.Q. test. Know your I.Q. Free sample. Test Center, Box 139, Fresh Meadows, N.Y. 11365.

LOANS By mail, $100-$1000. Anywhere. Confidential. Write Union Finance, Dept. PM, 222 W. Osborne, P.O. Box 7457, Phoenix, Arizona.

BORROW $100 to $1000 by mail. Quick, easy, private. No co-signers. Repay in 30 small monthly payments. For the amount you want write today to Dial Finance Co., 410 Kilpatrick Bldg., Dept. 2-001, Omaha, Nebraska 68102.

PRIVATE Address, remails 25¢, information quarter. Horton, 68 Kensington, Greenville, South Carolina 29609.

INVESTIGATORS, Free brochure, latest subminiature electronic surveillance equipment. Ace Electronics, 11500-P NW 7th Ave., Miami 50, Florida.

ONLY $44.00 monthly repays $1008.46 (thirty payments). Borrow $100-$1000 entirely by airmail. Write today. Bankers Investment Company, 67-A, Hutchinson, Kansas 67501.

NEED Money? Borrow $100-$1000 by mail. Confidential, repay in 24 months. Free loan application. American Loan Plan, Dept. BA-205, City National Bldg., Omaha 2, Nebraska.

OCCULT Supplies and services, catalogue free. "Lodge" Brantridge Forest, Balcombe, Sussex, England.

SWAP Ties up to six $1.00. Frankel's, 13818 Union, Cleveland 20, Ohio.

LEARN Spanish fast! New proven method. Free Details. Ray, Dept. B-1, 68 River Route, Kingman, Arizona.

STRAIN—Rectal strain relieving device, (External). Dr. Charles Hudson, 680 Dwr., Easton, Pennsylvania 18043.

DEBTS Pressing. Free yourself of debt. Clear credit. Free details. National Counselor, Harlingen 7, Texas.

GET Out of debt—Clear credit, quick relief. Advisor, Box 48337-G, Los Angeles 90048.

SOLVE Money worries. Borrow $100 to $800 entirely by mail on your signature. Fast, confidential. For amount you want, write Fairfax Family Fund, 2323 South Brook, Dept. 1336, Louisville 8, Ky.

RUPTURED. Relief and comfort. No understraps, elastic or steel. Write Hand-Lock Products, Preston 4, Ont., Canada.

WANTED—MISCELLANEOUS

STAMP Collections, accumulations. Eagle Stamp Co., 2221 Romine, Pittsburgh 26, Penna.

FOR SALE, MISCELLANEOUS

HEARING Aid batteries wholesale. Free list. Habs, Box 51, York, Penna.

CREATIVE Ideas in luxury gifts. Free brochure. Write; Roberta-Lenn Co., Box 70, Lathrup Village, Mich., 48037.

INVENTORS—If you have an invention for sale, patented or unpatented, write for free brochure outlining manufacturer's requirements. Royalty rates. Kessler Corporation, C-52PS, Fremont, Ohio.

50 BOOK Matches. Your name in gold. $2.50. Verhoff Products, Box 113P, Columbus Grove, Ohio.

HEARING Aids. Re-chargeable batteries, wholesale. Philupi, 1225 Hillside, North Bergen, N.J.

NEW Life-long flashlight, no batteries to fuss with, will not corrode or rust. Just plug in handy wall outlet for safe, complete recharging. $5.95 ppd. Selco, P.O. Box 12, South River, New Jersey.

PROTECT Identification, credit cards, photos, etc. from dirt, wear, with pressure sensitive laminating film. Dozen 3x4" sheets $1.00. H. King, 927 Maplewood, Pittsburgh, Pa. 15234.

AUTOMATIC Rafter computer. Dial hip, common, jack lengths instantly. Free literature. $4.95 postpaid. Satisfaction guaranteed. Emmert, Box 221, Sycamore, Illinois 60178.

MISCELLANEOUS

CESSPOOLS, Septic tanks restored to newness by miracle crystal pellets. Free literature. Electric Sewer Cleaning Co., Allston 34, Mass.

ORNAMENTAL Iron designs. Book of 1600 beautiful, practical designs for railings, columns, etc. Free literature. Cunningham, 3881 South 3200 West, Salt Lake City, Utah 84119.

LOANS By mail, $100-$1000. Anywhere. Confidential. Write Union Finance, Dept. PM, 222 W. Osborne, P.O. Box 7457, Phoenix, Arizona.

SEND Us wool for blankets. Free Literature. El Dorado Woolens, Eldorado, Texas.

BIRTH Certificates, Marriage Certificates, Diplomas! 2 blank forms $1.00. Sample 10¢. Standard Forms, Box 7228-M, Washington 4, D.C.

FREE Wholesale catalog! 100,000 products. Tremendous discounts! Taylor Distributors, Newton 2, New Jersey.

YOUR Name sent to 1000 importers, publishers, mailers, wholesalers, etc. on our mailing list. Year $1.00. Dixie Mailers, King, N. Car.

CIGARETTES—Make 20 plain or filtertip for 9¢. Factory-fresh pipe tobaccos. Mild tropical flavored Philippine cigars. Facts free. Moberly, Box 903, Owensboro, Kentucky.

SUPER Memory overnight! Success guaranteed! Bijou, Box 1727-M, Hollywood 28, California.

ARTHRITIS, Rheumatism sufferers. Get relief. Free literature. Penasa-M, Box 843, St. Cloud, Minn.

ROCKHOUNDS. Prospectors, science students. Identify valuable rocks, ores, with powerful ultra-violet lamp. Write for free circular. Glow Lamp, Box 845-PM, Bloomington, Indiana.

RECEIVE Gifts, samples, magazines, catalogs, opportunities, 10¢. Directory, Adkins, Texas 78101.

BRAND New! paperback books. 7 for $1.00. All subjects, almost 2000 titles. Free catalogues! Hallows, 14 Drexel, Cahokia, Illinois.

TRANSPARENT Mirrormaking brings quick, huge profits. Formula, instructions —$2.00. Neal Henndrix, Springhill, Louisiana 71075.

HOW To clear your credit quickly. Free details. Counselor, Harlingen 19, Texas.

STOP Bill collectors—Immediate action —free details; Advisor, Box 48337-A, Los Angeles 90048.

INSTALL Your own central vacuum. We have everything. Details $1.00. Wanda Mfg. Co., Comanche, Okla.

BOOKS On antiques and their prices. Free circular! P. Warman Publishers, Uniontown, Penna.

Here's all there is to know about this GMC pickup. Except for one small thing.

Husky wood floor is quiet and long lasting. None of that annoying drumming and rusting.

Strong. Quiet. Comfortable. Two walls of steel with a thick pad of insulation—not just one wall like some. Inside—adjustable seat back and foam seat.

No tangle of wires behind the instrument panel. In its place is a printed circuit. Only GMC has it.

Three letters that stand for three important things. Built by truck people. Sold by truck people. Serviced by truck people.

A GMC has four headlamps. Most other pickups have just two.

Progressive leaf rear springs automatically adjust to the load. Heavy loads, light loads or no load at all, the ride is steady and smooth.

Tires are king-size (8.15 x 15). Yet they're standard equipment on this GMC. Others charge extra.

The exclusive V-6 truck engine has gone 120,000, 130,000, even 150,000 miles before major overhaul. About half that is average. But the V-6 isn't just an average truck engine.

*Based on manufacturers' suggested retail prices, the GMC V-6 model pictured above is never priced more than $49 over comparable competitive base models. Often the difference is less.

GMC
GENERAL MOTORS CORPORATION
TRUCKS
FROM ¼ TO 60 TONS

GMC offers a proven total suspension system of independent front and progressive leaf rear springs. Result? Always a smooth ride even with maximum loads.

The price. It's only $49* more than others.

Why Camping Families Love Nimrods

Mom says, "Bless those slide-out beds. Bed clothes stay up off the floor — neat, clean. No struggle when you are weary."

"After a long day's travel, Nimrod's quick set-up is worth its weight in gold."

"On hot nights Nimrod's big windows catch every breeze."

"Nimrod's big floor space is wonderful — especially on rainy days."

"I enjoy looking stylish on the road. Nimrods are so pretty."

Dad says, "The way it handles on the road is great. So light and well balanced. And easy to maneuver by hand at the campsite."

"Three things—steel construction, undercoating and baked enamel finish—tell me I'll have years of good service."

"I like the design of Nimrod bed supports. They're firmly anchored in the trailer, not on the ground which might be soft or muddy causing beds to sag or bend."

Kids say, "Yippee! We're all going Nimrodding!"

"Yippee" is the word for the marvelous new 1965 Nimrods. Four great models. See your Nimrod dealer for a demonstration. Or write for free Nimrod "Magic Carpet" brochure.

NIMROD

Nimrod Equipment Division • 516 Ford Blvd. • Hamilton, Ohio

Nimrod—America's largest selling camping trailer.

For a World's Fair Campsite, see your Nimrod dealer.

"We think it's smart to let used car buyers browse. We're Chevy dealers."

A Chevy dealer talks this way because he'd rather have a customer take his time and look around. For one thing, he has lots of cars on hand that his *new* Chevrolet customers traded in. And salesmen who'd rather help than hurry you in making up your mind.

Most important, he knows you're more likely to find *exactly* the car you'll be completely satisfied with. That will make you want to come back some day to buy another. Or maybe a new one.

And your Chevy dealer can offer you service *after* you buy, if you ever need it. So you've got every good reason to look for the OK sign. . . . Chevrolet Division, General Motors, Detroit, Michigan.

SEE YOUR CHEVROLET DEALER FOR THE USED CAR OR TRUCK YOU WANT

Meet the New Yorker, created in honor of the New York World's Fair

We hope you will soon be visiting the New York World's Fair—and our exciting General Cigar Hall of Magic. But even before you do, you can start enjoying this most extraordinary cigar.

Here is a big cigar for the big moments and the big pleasures. A cigar that's the very essence of New York, and the great new Fair. Yet, the New Yorker's unique blend of case-aged tobacco gives you both mildness and flavor—flavor you don't have to inhale to enjoy.

We'd be pleased to have you compare the White Owl New Yorker with any cigar you can buy—particularly cigars costing two for 25¢ and up. You'll see, quickly, that this newest White Owl does full justice to its name—and to your smoking pleasure.

So come to the World's Fair. "Meet us under the smoke rings." But before you do, meet the White Owl New Yorker. It's at your cigar counter now, in striking new Royal Red and White boxes and five-packs.

$7 a Year Heats the

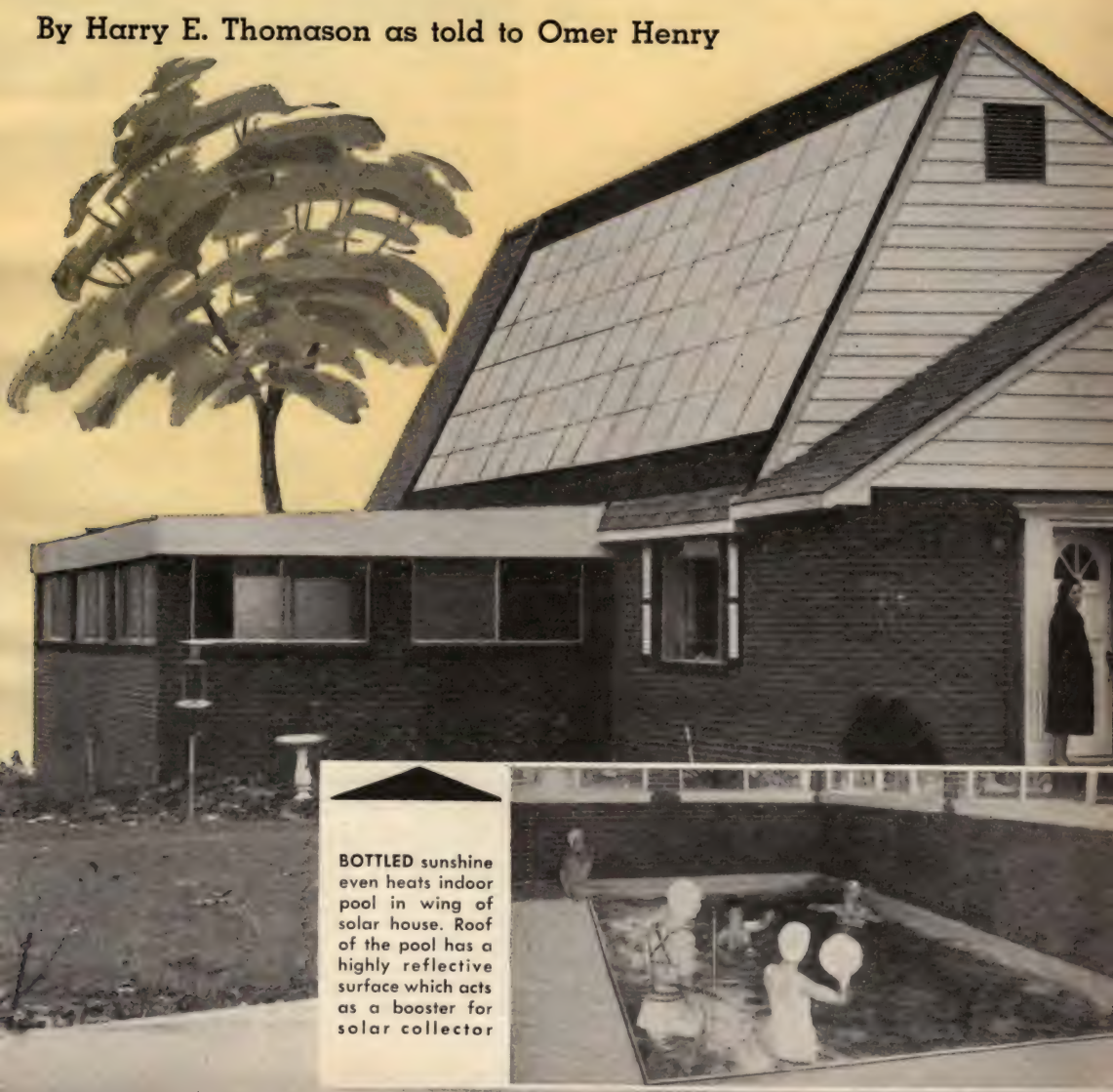
House with Sunshine in the Basement

A FEW YEARS AGO, I read a science news item somewhere regarding solar energy. It said that sunlight striking less than a 100-mile square of Arizona desert, if completely used, would be enough to power all the industry in the United States.

I remember being slightly appalled by the magnitude of all that potential power going to waste. I also remember thinking that if such a small bit of sunlight, properly harnessed, could accomplish so much, it shouldn't take more than a tiny patch of it to heat a house all winter.

I knew there had been a number of attempts to do this in the past. Massachusetts Institute of Technology pursued sev-

By Harry E. Thomason as told to Omer Henry



BOTTLED sunshine even heats indoor pool in wing of solar house. Roof of the pool has a highly reflective surface which acts as a booster for solar collector

eral concepts to harness sunlight for home heating. Successfully, too. But to the best of my knowledge no system yet devised had the practical efficiency I had in mind.

The more I thought about it, the more intrigued I became. So did my wife, and for several years we both researched and ran experiments in various solar heating principles. The upshot, of course, was that we finally worked ourselves up to building a solar house, incorporating known principles as well as ideas of our own that we hoped would add the ingredients of economic and structural practicality.

Item One: Sunshine Trap

The first job was to devise a cheap, efficient heat collector to capture solar energy. Since the sun shines on a given spot for only a few hours a day in winter, and often not at all for days on end, there also had to be an economical means of storing and retaining large quantities of captured heat. While a number of scientists have produced a variety of such devices, once again none has a degree of heat-storing efficiency high enough to be practical in North temperate areas.

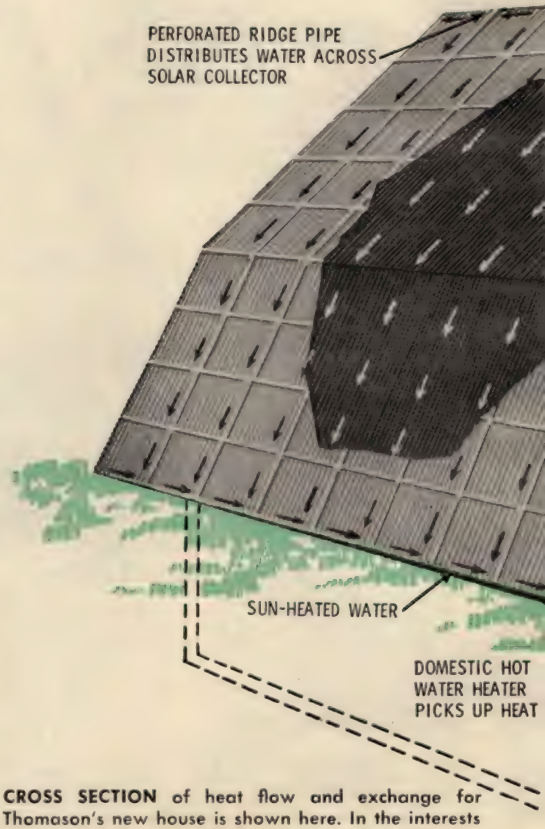
Then there was the routine matter of heat exchange and distribution, requiring the usual ducts, registers, and themostatic apparatus to control release of heat.

There was no point in stopping there. If you can heat a house with solar energy, you can certainly use the same basic system to cool it in summer by reversing the process. This had been done at M.I.T. Therefore I included airconditioning in my plans.

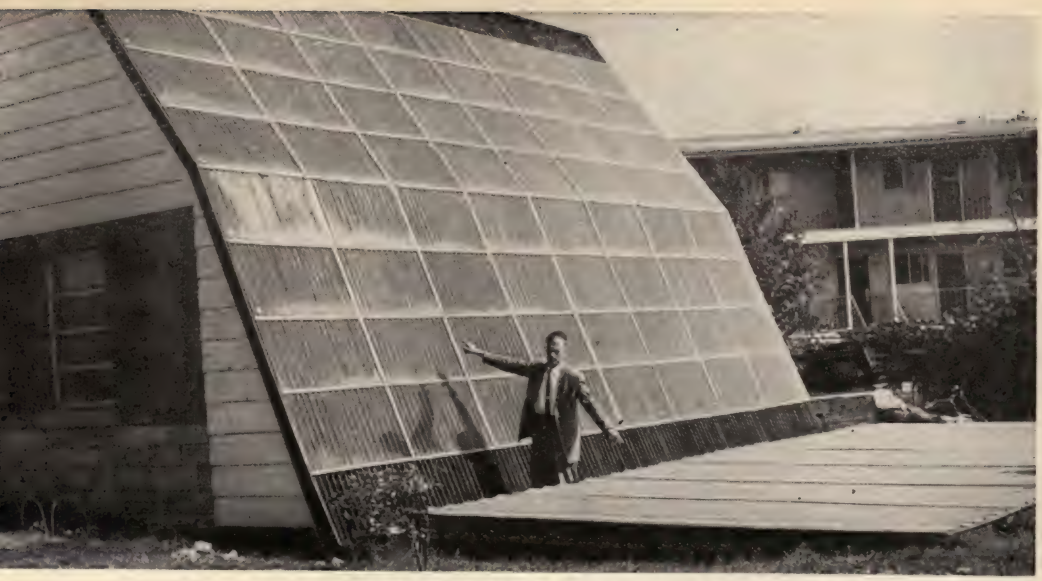
All went well with the construction until a truck delivered the 1,600 gallon tank that was to become the heart of my heat storage unit. Then, people became curious. They'd drive by slowly, looking at that over-sized tank. Pedestrians stopped to examine it, even to open the manhole and peer inside. Interruptions and endless questions nearly brought progress to a grinding halt.

This nuisance didn't help my frame of mind at this crucial stage. The heat storage unit is actually the heart of the system. Since it was all my own design, I was plagued with a number of doubts about it. How much would it cost? How much heat could I store? How long could I hold it? How could I release it automatically and in controlled quantities as

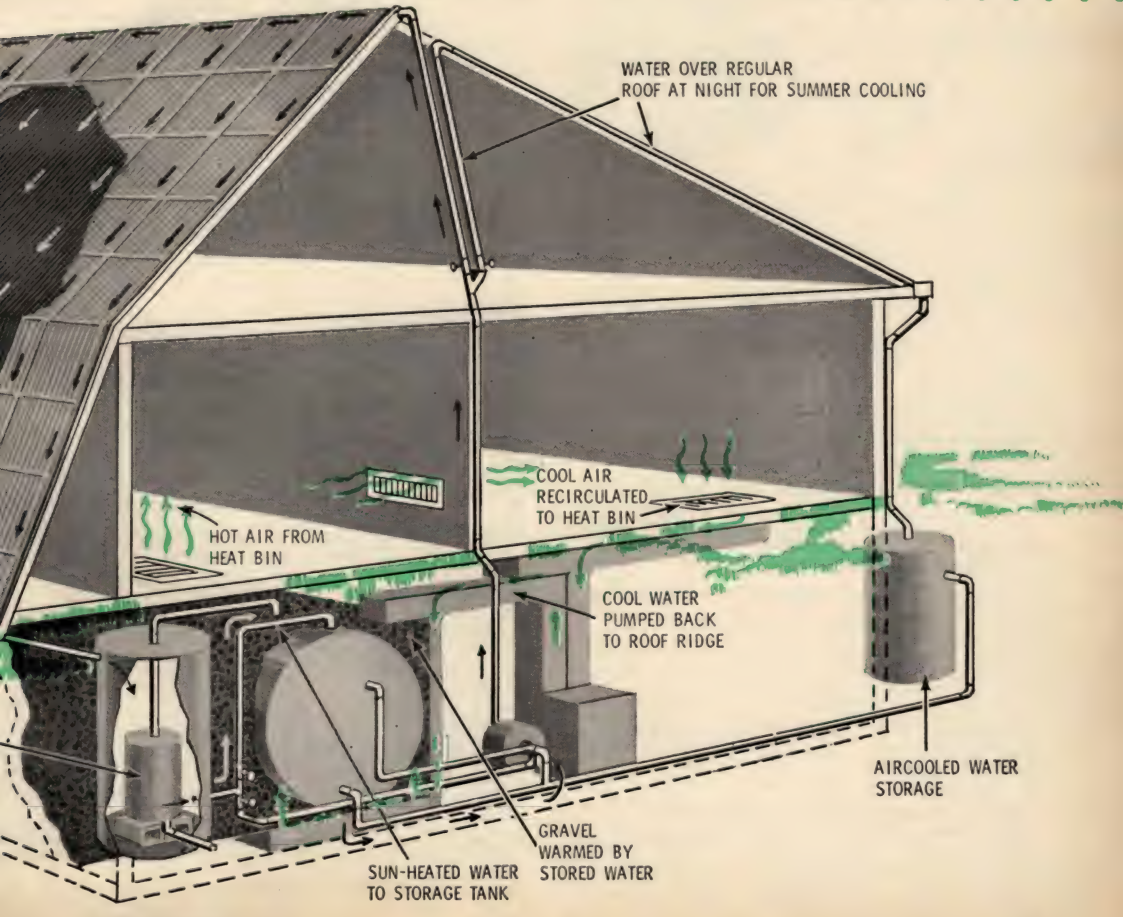
OUTDOOR POOL at Thomason's first solar house had its water warmed by solar energy stored in system's heat bin. The kids swam in it when snow was flying


PERFORATED RIDGE PIPE DISTRIBUTES WATER ACROSS SOLAR COLLECTOR
SUN-HEATED WATER
DOMESTIC HOT WATER HEATER PICKS UP HEAT

CROSS SECTION of heat flow and exchange for Thomason's new house is shown here. In the interests of clarity, diagram doesn't cover airconditioning cycle. Water for it is collected in the tank at right.



INVENTOR THOMASON stands between heat trap, at left, and heat reflector on the ground—for house number two. Reflector increased efficiency of the heat trap by 30 percent; became roof of the pool wing on the newest house


WATER OVER REGULAR ROOF AT NIGHT FOR SUMMER COOLING
COOL AIR RECIRCULATED TO HEAT BIN
HOT AIR FROM HEAT BIN
COOL WATER PUMPED BACK TO ROOF RIDGE
AIRCOOLED WATER STORAGE
GRAVEL WARMED BY STORED WATER
SUN-HEATED WATER TO STORAGE TANK

BUILDING heat trap on roof of newest house. Roof itself is insulated. On top goes layer of fiberglass, corrugated aluminum, topped by glass panes

it actually became needed?

The heat bin went in first. It was 10 feet wide, 25 feet long, and 7 feet high. In it I placed the 1600 gallon drum. Since I'd decided on a hot air heating system, the bin was fitted with ducts, a blower, filter and registers.

Fifty tons of fist-sized rocks finally were dumped into the bin, around the tank. The sun-heated water would raise the temperature of the rocks which, as everyone knows, retain heat well. These rocks would become the immediate source of heat for my home. When this was done, I insulated and sealed the bin airtight.

Although the bin was completed as planned, I was uneasy about it. To do its necessary work, it had to be able to release enough heat to warm the house for periods longer than 24 hours. Unless it did, my system was of little—if any—value. Certainly, it would be no improvement over any existing systems. There were plenty of people who assured me that such would be the case. With doubts looming, I contracted with a plumber to install the water piping system, while I set about constructing the solar energy trap. The trap had to intercept as much sunlight as possible. It also had to be inexpensive, long-lived, and immune from freezing on cold winter nights. To achieve these goals, I topped a base of insulation with blackened sheets of corrugated aluminum. Above that went polyester film and window glass transparencies.

This trap, forming one entire side of the roof, was angled to catch a maximum of sun's rays throughout the year. Water, pumped from the tank to the top of the trap, would run down the corrugated valleys, pick up solar energy from the heat of the sun, and return to the tank at much higher temperatures. This energized water in the tank would be circulated through duct work to heat the house.

As the heat trap neared completion, its 840 square feet of glass excited even more curiosity than the storage tank. As patents had not been issued on the devices I was using, I did not always answer visitors' questions. This gave my project an air of mystery, and aroused some resentment.

PYRANOMETER is used by the Thomasons to measure intensity of the sunlight. It provides an index to amount of solar energy being taken by system

One neighboring resident accused me of violating the zoning ordinances by setting up a business in a residential area. When I denied such intentions, with some bewilderment, he waved an arm in the direction of the solar collector. "You expect me to believe that you're building a *private* greenhouse that big?" he asked.

As the house neared completion, I devised several tests for the system. I invited several individuals to witness them —U. S. Army patent attorney Major Richwine, Weather Bureau scientist Torrance H. MacDonald, U. S. Patent Office Examiner J. C. Myhre, and the Chief Building Inspector.

On the appointed day the sky was overcast. Despite my anxiety, there was nothing to do but proceed.

When the last guest had arrived, I checked the temperature of the water going into the heat collector. It was 60 degrees Fahrenheit. This I announced.

If the heat collector really worked, water leaving it for the heat bin should be considerably warmer than 68 degrees—even on a cloudy day. With trepidation I inserted the thermometer in the large stream of water leaving the heat collector for the heat bin. A few minutes later I removed it. The mercury stood at 78! This was better than I had expected.

"What's it say?" Major Richwine asked. For an answer, I held out the thermometer. My visitors were properly impressed.

In my collector, the sun was heating 13 gallons of water per minute—raising the temperature 10 degrees. How good is that? On a cloudy day, something like 84,000 BTUs per hour would be falling on the collector. I was recovering about 64,800 BTUs per hour. Only a fair recovery. But with adjustment in water flow I knew I could improve it.

Reflector for Heat Trap

I'd have to if my system was to be practical. This meant tests, meticulous records, careful evaluation of all results and building more efficiency into the parts of the system that showed up badly.

In the meantime I re-examined my plan. It occurred to me that the more sunlight I could get on the heat collector, other elements being equal, the more heat I could trap. Therefore I built an aluminum reflector in front of the heat trap. I tilted it slightly so it would catch the low rays of the winter sun and bounce them against the heat collector. By measuring heat dif-

(Please turn to page 234)

NEW POOL'S WATER as well as the wing it is in, are heated by trapped sunshine. Here Thomason is shown taking temperature of the water in the pool

COLLECTOR closeup shows corrugations in the black-coated aluminum. Water running down these valleys picks up the sun's heat, and carries it to storage

PM OWNERS REPORT

A Nationwide Survey Based on 591,676 Owner-Driven Miles

Chevy's Liquid Lines Top Assembly Gremlins

Marginal and boldface comments by Ed Nelson PM's Automotive Editor

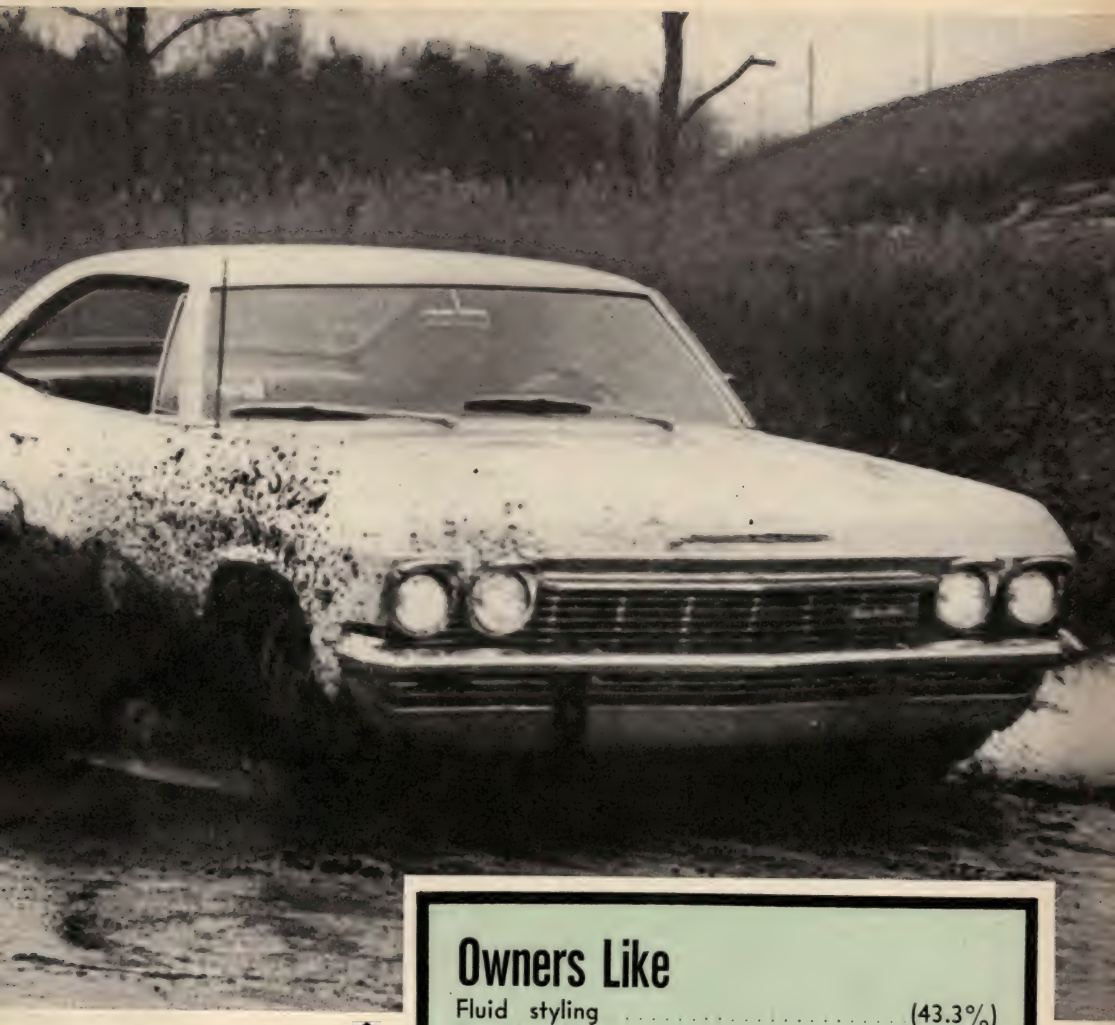
THEY'VE NEVER MET, but the Nebraska professor and the Pennsylvania secretary agree on one thing: They like the flowing lines and semi-fastback sweep of their new Chevrolets.

The Tennessee postmaster is more impressed with the way Chevy handles on curves, and the North Carolina minister says it "takes bumps like a Cadillac."

Less enchanted is the Texas manufacturers' agent. He told *PM*, "The car is better than a mule—but not by much. The tires are out of round, the doors don't fit and can't be unbuttoned when locked, upholstery is loose around the rear window and the glove compartment falls open."

These are typical of the features owners like most and least about their new Chevrolets, as reported in *Popular Mechanics*' first 1965 Owners Report. The enchantment outweighed the disenchantment, as it usually does. But the number of assembly and workmanship complaints is substantially higher than

PM'S CAMERA CASE does its regular duty as a size reference in the Chevy trunk. Grocery-bag high near front, it got owner salutes



FENDER WELLS CONFINED splash surprisingly well considering the amount of dirty water we threw up during this run through a muddy puddle. Owners paid tribute to good vision through wide Chevrolet windshield

OVER-ALL FUEL CONSUMPTION reported by bulk of owners was about 15-16 m.p.g. More than three-quarters of the owners had Powerglide transmissions. The basic 195-hp. V8 (283-inch) was most popular engine

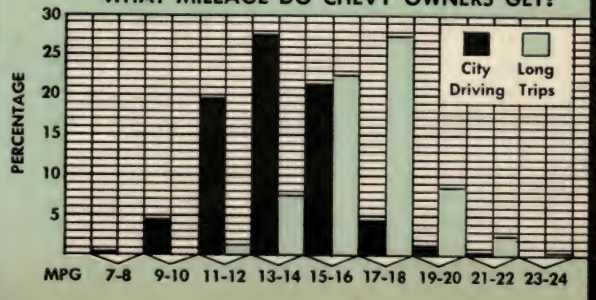
Owners Like

Fluid styling	(43.3%)
Easy handling	(36.0%)
Cushiony ride	(25.6%)

But Dislike

Assembly, workmanship	(16.9%)
Whistling windows	(12.8%)
Rattles and squeaks	(12.1%)

WHAT MILEAGE DO CHEVY OWNERS GET?



WHEEL SPRING RATES ARE SOFTER this year, but the test Impala didn't wallow unusually. This sharp hole was swallowed up well with new shocks controlling springs. One fourth of the owners called ride their favorite feature

This disenchantment → may fade as quality controls are improved

we usually get from Chevy owners, perhaps because of the troubled production start-up this year. In spite of the problems, 86.2 percent of the Chevy owners we surveyed would buy a Chevrolet again. (Ford had problems, too, as the report on page 100 shows.)

Our test Impala had the curved-glass trouble mentioned by several hardtop owners—side windows wouldn't stay in their channels. We used the Tracktest fifth-wheel electric speedometer to check acceleration and paired it with the electric fuel meter for steady-speed fuel consumption figures. In spite of curb weight close to two tons and the handicap of Chevrolet's two-speed Powerglide transmission, the 195-hp. V8 reached a true 60 m.p.h. from a standing start in 11.0 seconds. Checking passing performance, we got 40-60-m.p.h. and 50-70-m.p.h. acceleration times of 7.7 and 5.6 seconds, respectively.

We checked constant-speed fuel consumption at a true 30, 40, 50, 60, and 70 m.p.h. and got an average 19.21, 20.22, 18.61, 16.52 and 14.13 m.p.g.

Will GM's voluptuous curves outsell Ford's crisper lines? Tune in next fall for the next chapter →

Now let's listen to the owners themselves. The five Chevy features praised most often, in the order of their popularity, were styling, handling ease, ride, power performance, and the attractive interior. Here are some sample comments:

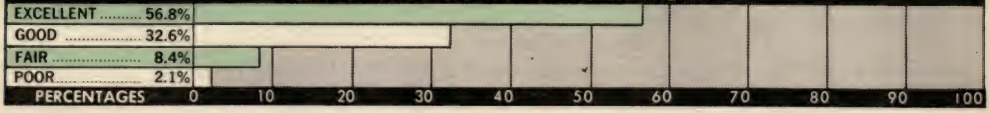
"It looks like the Riviera."—Michigan plant manager.

"The exterior style is very Corvette-ish, and I'm a 'Vette fan."—Pennsylvania teacher.

"It handles much better; there's a big improvement in front-

CURVED WINDOW GLASS without supporting frame or eye-warming trim got complaints. Owners reported they don't operate well or close tightly and generally blamed windows for wind noise. Noise was mentioned by 12.8 percent

SUMMARY OF OWNERS REPORT



Fuel economy
About as expected 50.9%
Better 15.2
Not as good 24.6
Best-liked features
Styling 43.3
Handling 36.0
Ride 25.6
Power, performance 14.9
Interior 10.7
Roominess 9.3
Comfort 8.7
Steering 5.9
Specific complaints
Assembly and workmanship .. 16.6
Wind noise 12.8
Rattles and squeaks 12.1
Rear visibility 10.0
Curved, frameless windows .. 5.5
Paint 5.5
Gas mileage 4.5
New key system 3.1
Mechanical trouble, if any
None 67.5
Carburetor 5.8
Transmission 3.1
Suspension 2.4
Best-liked exterior style features
Smooth, clean lines 12.1
Fastback styling 7.6
Front end 7.3
Roof line 5.9

Least-liked exterior style features
Front bumper 7.3%
No protective side trim 6.2
Rear window 4.5
Curved, frameless windows ... 4.5
Best-liked interior features
Dashboard 23.2
Roominess 13.1
Upholstery 11.4
Seats 9.7
Instrument panel 7.6
Steering wheel 2.1
Luxury touches 2.1
Gauges instead of lights 2.1
Least-liked interior features
Dashboard 6.9
Ash tray 4.5
Glove compartmnt 4.2
Seats 3.1
Headroom 2.4
Console 2.4
Decision to buy Chevrolet most influenced by:
Previously owned Chevrolet .. 8.4
Styling 36.0
Resale value 20.8
Price 13.8
Economy of operation 7.3
Trade-in 6.2
Dealer service 6.2
Consider a different car?
Yes 43.6

Other make considered
Ford 15.9%
Pontiac 10.0
Buick 5.2
Oldsmobile 5.2
Plymouth 4.8
Is Chevrolet family's only car?
Yes 55.7
Make of family's other car
Chevrolet 19.0
Ford 6.6
Plymouth 4.8
Pontiac 3.1
Buick 2.8
Falcon 2.4
Chevy II 2.1
Oldsmobile 2.1
Make of car traded in
Chevrolet 58.8
Ford 6.6
Pontiac 3.1
Buick 2.1
Chevy II 1.7
Corvair 1.4
Rambler 1.4
How is dealer's service?
Excellent 64.3
Average 24.9
Poor 8.7
Would you buy another Chevrolet?
Yes 86.2
No 4.5

REAR VISION THROUGH SLANTED back window is little help in parking, as this driver's-eye-level photo shows. Owners found this aspect a problem, but they were in favor of soft, semi-fastback styling and down-sloping rear deck

end action."—North Carolina electronic technician.

"The car handles much better than my '63 in curves. The power steering is improved. And in severe braking it doesn't dip forward, it squats."—Indiana lubrication engineer.

"The ride is like floating in mid-air."—New York grocer.

A 327-inch V8 small? Must be a Texan talking →

"I decided against an Oldsmobile because the Chevrolet also rode and drove like a heavy car."—Texas railroad switchman.

"I decided on Chevrolet because of the performance of its small engine (250-hp. V8) pulling 4000 lbs."—Texas machinist.

"The 195-hp. engine gives good all-around performance."—Ohio millwright.

"It has good get-up-and-go."—New York laborer.

"The interior looks like that of a $6000 car."—Tennessee highway worker.

"Beautiful interior design and upholstery."—New York teacher.

There's lots to like, but there are still a few thistles in the garden. Besides assembly, owners mention wind noise, rattles and squeaks, poor rear vision and carburetor trouble.

Did someone in Detroit say "Ouch"? →

"The car wasn't put together well. Muffler and tailpipe fell off, radio antenna fell off, interior screws were loose, interior lights shorted out, upholstery was torn."—Illinois rate analyst.

"Being a new model, one of the first off the line, interior fitting is a little 'chintzy.' Lots of little things add up to aggravation."—New York air traffic controller.

"Windows don't shut tight enough; there's always a draft."—New York chauffeur.

Backing those new fastbacks is something of a guessing game, but buyers like the shape →

"Vents whistle at speeds over 40 m.p.h."—New York salesman.

"The body rattles sound like rain hitting the car."—Maryland lumberyard worker.

"I can't see the fenders through the rear window."—Illinois plant supervisor.

"Bad carb accelerator pump."—Missouri garage foreman.

"Trouble with the carburetor and timing."—Ohio farmer.

With the praises numbered six through ten, Chevrolet owners get more specific:

"There's more inside room,"—New York student.

Four-doors have a nice 3½ inches more shoulder room in front, 3¼ more hip room in back →

"I like the size inside—about 4 inches more seat space."—Louisiana priest.

"Like the comfortable seats; they're higher than before."

(Please turn to page 236)

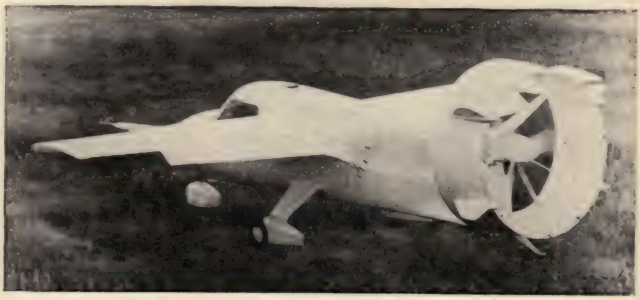
Monorail in a Mine

Powered by a 62-horsepower diesel, this small locomotive can pull a 30-ton pay load up an incline of 15 degrees.

Installed in a South African mine, it pulls a train of tubs along an overhead track fabricated from 10 by 8-inch steel joists. The train can negotiate curves of 25-foot radius.

Pusher-Prop STOL

Variable-camber wings increase its lift, thousands of small holes in the wings through which air is sucked decrease its drag, and a duct around the propeller increases its thrust in this short-takeoff-or-landing plane produced by the University of Mississippi.



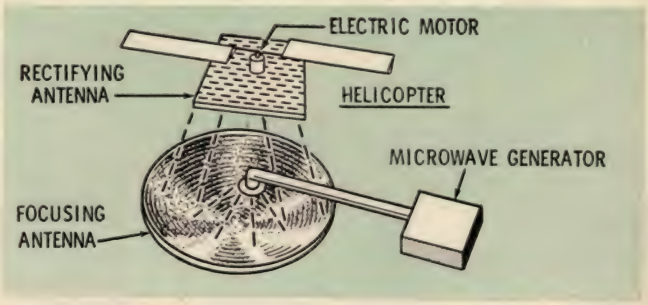
Invisible Power

Microwave energy, like that used in radar, has—for the first time—been beamed through the air to power a motor without wires.

Demonstrating with a small tethered helicopter rotor, the Raytheon Company showed how microwaves beamed from a saucerlike transmitting antenna are converted by a rectifying antenna (a screen beaded with thousands of half-inch-long diodes), producing direct current.

Future uses of such power could be for "flying platforms" for television transmission, missile detection, aviation beacons, navigational and weather aids and surveillance satellites.

Ultimately, generators producing up to 500 kilowatts of power at 70-percent efficiency could maintain helicopters for extended periods up to 50,000 feet.



PM OWNERS REPORT

Ford's Lullaby Ride

A Nationwide Survey Based on 504,510 Owner-Driven Miles

Marginal and boldface comments by Ed Nelson
PM's Automotive Editor

"MY ONLY COMPLAINT," the civil engineer from New York told *PM*, "is that I own only one Ford. It's the best-riding ever, smooth, supple and extremely quiet."

A fellow new-Ford owner who sells real estate seconded the emotion. "The new ride is wonderful," he told us, "and the engine so quiet you can't believe it's there until you step on the gas. Then it's *there*!"

Not all owners agreed that their Fords were castles of silence, or would—as Ford ads indicate—top Rolls-Royce in quietness. As one Pennsylvania machinist said: "They talk so much about silent ride but we always hear the wind even with the windows closed—it's very annoying." And a Michigan

CRISP, HARD-EDGED NEW FORD STYLING is popular with owners of the '65, but it doesn't excite them as much as soft-look fans like Chevrolet's 1965 lines. Ford buyers appreciate their cars' rather flat cornering and comfortable ride

Not Always Squeak Free

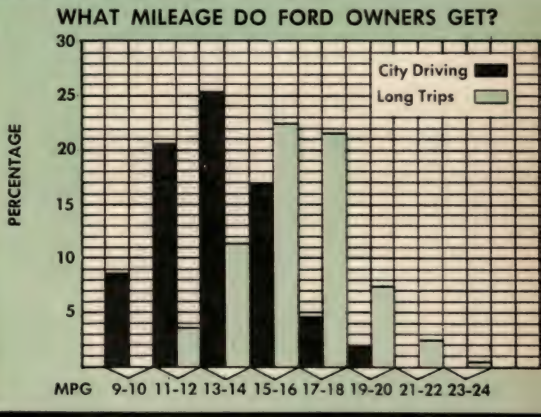
electrician noted: "We've been plagued with squeaks, rattles and vibrations."

Approximately 8.5 percent of the owners responding to *PM*'s survey agreed with the man from Michigan, making rattles and squeaks the second most numerous complaint on these cars—all of which were sold to owners early in the new model season. But some 22.5 percent of the owners listed the new Ford's quietness as a best-liked feature, and this is up substantially from the 8.2 percent who praised the quietness of last year's Fords.

The new Fords also impress their owners as being more economical than the old ones. Some 18.7 percent of this year's owners found gasoline mileage better than expected; only 14.8 percent did last year. And complaints about gasoline mileage dropped from 14.8 to 4.4 percent.

Our test Ford was an LTD with automatic transmission and

FROM 13 TO 16 MILES PER GALLON over-all was reported by the bulk of Ford owners. Chart here shows city, highway driving fuel consumption breakdown



Owners Like

Well-controlled ride	(51.0%)
Effortless handling	(37.8%)
Square-cut styling	(34.0%)

But Dislike

Sloppy assembly	(18.0%)
Rattles and squeaks	(8.5%)
Ashtray position	(7.1%)

"DO SOMETHING BETTER WITH tangle under the dash," one owner asked. Test LTD also had sound proofing blanket dangling from behind glove box

AN EXTRA TWO CUBIC FEET of trunk volume drew praise from 3.5 percent of Ford owners. It's a side benefit from squared-off style. Lift height is reduced

a monster 300-hp., 390-cubic-inch engine. We expected it to use more gas and give warmer performance than a small-engined Ford. It did not disappoint us. At steady speeds, verified by *PM's* fifth wheel (throughout the range, the car's speedo read 5 to 6 m.p.h. high), we got these fuel figures: 30 m.p.h.—16.3 m.p.g.; 40 m.p.h.—17.8 m.p.g.; 50 m.p.h.—17.0 m.p.g.; 60 m.p.h.—14.1 m.p.g.; 70 m.p.h.—11.8 m.p.g.

This is pretty far off. Don't count on your own speedo being so optimistic →

Throughout several hundred miles of mixed city and highway driving, including acceleration and steady-speed testing, we averaged 13.4 m.p.g.

In our acceleration tests, the LTD reached a true 60 from a standing start in 9.3 seconds with a test load of about 315 pounds. We accelerated from a steady 40 to 60 in 4.8 and from 50 to 70 in 7.0 seconds using "drive" all the way. For the passing tests, the test load was held to about 250 pounds.

Are cars better or owners more forgiving? →

As usual, of course, the great majority of owners generally was satisfied with the '65 Ford. Only two percent say they wouldn't buy another; in '64, 4.5 percent said the same thing.

Letting our owners' panel speak for itself, here are sample comments about the five features liked best:

"They ride easier and smoother than before." Texas lineman.

"Superior riding qualities, especially over rough city streets."—Chicago policeman.

"The new suspension gives it a much better ride."—New York banker.

OWNERS OBJECT TO FRONT ASHTRAY location that tempts the driver's eyes away from the road. But LTD has small extra trays in arm rests. Buyers also reported wide power brake pedal nearly traps your accelerator pedal foot

The new chassis and new rear end make good partners in the twist

"I like the comfort and handling of the machine. There's not a bit of effort. Curves are no problem . . . no swaying or leaning."—Pennsylvania banker.

"Handles much easier than my old car ('62 Ford)."—Illinois retailer.

"I'm a hard driver and like the easy handling and flat cornering."—Illinois millwright.

"It has very harmonious lines."—New Jersey dentist.

"Our Ford is a well-built, beautifully engineered car that looks far more luxurious and expensive than the cost would indicate."—Illinois carpenter.

"It is very quiet compared to our '62."—Illinois farmer.

It's the old power-to-weight magic. Horsepower rating is up from 220 to 250 and weights have been shaved

"There's lots of pep, if and when you need it."—Indiana salesman.

"The 150-hp. Six is very smooth and has plenty of pep."—Missouri photographer.

Assembly and workmanship drew the most complaints, followed by rattles and squeaks, front ashtray location, wind noise, and poor finish. Here are samples of owners' reactions:

"It is only half put together; I'd like a better assembly line."—Pennsylvania electrician.

"Radio speaker had to be repaired; chrome trim was bent; screws were out and are still falling out; left rear door doesn't fit and sometimes won't open; glass has brown blotches; the brakes seem to be going bad and the glove box must be pried

Even if the dealer isn't interested in cases like this, the factory is. Particularly Ford boss Lee Iacocca →

open."—Illinois railroad conductor.

"There was hurried workmanship during assembly."—Texas Army officer.

"It's very noisy—doors fit poorly and there's extremely poor quality control in general. I'd best describe it as 'a pretty face with naught behind it.' "—Pennsylvania broker.

"Chrome trim seems to have been installed by accident, it is so loose and noisy and poorly fitted."—Pennsylvania salesman.

You're actually safer dumping your ashes on the floor →

"The ashtray is inconvenient to the driver and too small."—New York restaurant operator.

"Ashtray and lighter too far away from driver."—Pennsylvania master brewer.

"There's too much wind noise at highway speeds, even with windows closed."—Missouri physician.

"The windows or vents do not seal off wind at 50 to 65 m.p.h. . . . quite a bit of noise."—Texas retiree.

"Paint job not properly masked or compounded."—School guidance counselor.

"Finish not as good as in prior years."—New Jersey personnel director.

The plushy interior stimulated the first of the next group of salutes from Ford owners. With the most commented on features mentioned first, here are samples from numbers 6 through 10 of what owners liked:

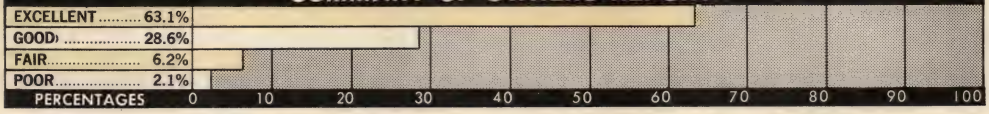
"The best Ford interior ever. Good styling."—New Jersey housewife.

"Beautiful, luxurious interior with much room."—Illinois office manager.

"There's plenty of space, particularly in the front seat.

(Please turn to page 240)

SUMMARY OF OWNERS REPORT



Fuel economy
About as expected 51.7%
Better 18.7
Not as good 19.7

Best-Liked features
Ride 51.0
Ease of handling 37.8
Styling 34.0
Quietness 22.5
Power, performance 17.0
Interior 10.2
Roominess 8.8

Specific complaints
Assembly, workmanship 18.0
Rattles and squeaks 8.5
Ash tray placement 7.1
Wind noise 5.4
Poor finish 5.1
Gas mileage 4.4
Power steering 2.0
Brake pedal placement 2.0
Suspension system 2.0
Dust leaks 2.0

Best-liked exterior features
Clean, chromeless body 18.4
Headlights 10.5
Front end 8.2
Taillights 4.1

Least-liked exterior style features
No protective side trim 4.4
Rear end 3.4
Taillights 3.1

Best-liked interior features
Dashboard 16.3%
Instrumental panel 12.6
Upholstery 10.9
Seats 8.8
Roominess 7.1
Comfort 4.8
Trim 4.1

Least-liked interior features
Ashtray 16.0
Radio position 2.7
Seat belts 2.7
Idiot lights 2.0
Light on shift quadrant 1.7

Mechanical trouble, if any
None 72.8
Transmission 4.1
Power steering 2.7
Brakes 2.4
Oil leaks 2.4

Decision to buy Ford most influenced by:
Past Ford experience 44.9
Styling 37.8
Price 15.3
Dealer 14.6
Trade-in 9.2
Ride 6.5
Operating economy 5.1
Power performance 5.1

Consider a different car?
Yes 44.2

Other make considered
Chevrolet 22.8%
Pontiac 10.2
Oldsmobile 3.4
Buick 3.1
Mercury 3.1
Plymouth 2.0
Dodge 2.0

Is Ford family's only car?
Yes 61.6

Make of family's other car
Ford 16.7
Falcon 4.4
Chevrolet 4.4
Corvair 2.0
Buick 1.4
Pontiac 1.4
Volkswagen 1.4

Make of car traded in
Ford 67.1
Chevrolet 6.1
Falcon 2.7
Comet 1.7
Thunderbird 1.4
Mercury 1.4

How is dealer's service?
Excellent 53.1
Average 32.0
Poor 7.1

Would you buy another Ford?
Yes 86.1
No 2.0

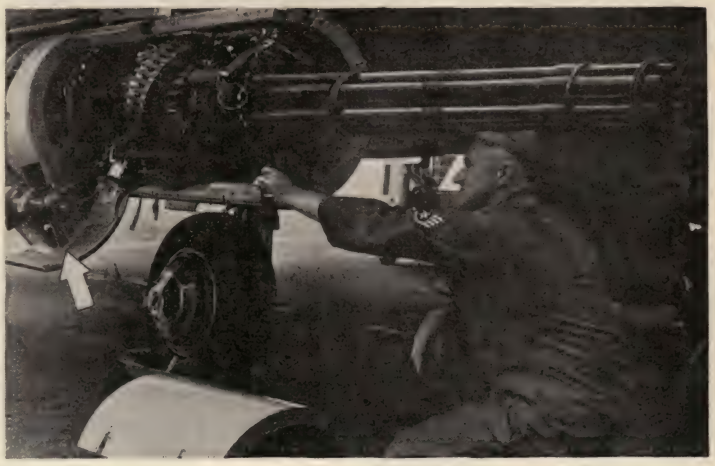
Gun Pod

Strapped beneath the wing like a wing tank, a pod carrying a 20-mm. cannon will fire 6000 rounds per minute.

The gun, which is currently mounted permanently in the fuselage of some supersonic fighters, can now be attached quickly under the wings in the bomb pylons.

Called the Vulpod, it has a ram-air turbine generator (arrow) that supplies electrical power to the gun, and a linkless feed system that ejects the spent cartridges.

The cannon has six rotating barrels.



Dummy in Moon Program

Moon-bound astronauts will know what to expect from acceleration and G forces thanks to this dummy, shown having his "brain" installed. In pre-manned flight experiments of Apollo program, sensing and transmitting devices in dummy's skull will register forces up to about 50 Gs.

Wrap-Around Heels for Drivers

Shoes designed for sports car drivers have rounded, serrated heels to provide a comfortable rest for the foot on the accelerator. The heel design is also said to cut down wear on floor mats. Price is $19.95 (plus 50 cents postage) from Fellman, Ltd., 6 E. 46th St., New York.

Old-Time Sport in a

By John Boykin

THE GOOD KING KAMEHAMEHA I would spin in his celestial haunts if he could see what has happened to outrigger canoeing, the sport of ancient Hawaii.

Fiberglass has happened, that's what.

With three 40-foot wooden racing canoes imported from Hawaii, the Balboa Outrigger Club attempted, a few years ago, to spread the island sport throughout California.

There was great interest, but the craftsmanship required to carve a racing canoe from a single tree was lacking, and the cost of importing canoes from Hawaii was exorbitant.

So club members solved the problem with fiberglass. Using one of the wooden canoes as a model, they began turning out fiberglass shells. In the process they came up with an outrigger that was 150 pounds lighter than the original, is more rugged and requires almost no care while transporting. It was so good, in fact, that the

FIBERGLASS SHELL molded from an original Hawaiian racing outrigger is made to resemble original in every detail by members of Balboa Outrigger Club

DIGGING FURIOUSLY with fan-shaped paddles, the six-man crews of three 40-foot fiberglass outrigger canoes break from a start in a race in California

Fiberglass Shell

fiberglass canoes are now being transported to Hawaii, where they are popular, and there is a special racing class for them.

In California there is now a state racing association which sponsors outrigger races, varying from sprints of a few miles to the grueling 26-mile Catalina Channel race.

Paddled by six strong men, the fiberglass outriggers cut through the water at speeds up to about 10 miles an hour, and superior crews have been known to maintain a speed of eight to nine miles per hour for a stretch of 30 miles or more.

The canoe racing season in California extends from July to October. The crew that compiles the most points for wins is sent to Hawaii to compete in the World Series of outrigger canoeing, a 38-mile race across the treacherous channel from Molokai to Oahu, finishing at Waikiki's Duke Kahanamoku beach.

Lacking experience, the mainland crews have never placed in this race. But they get closer all the time.

RHYTHMIC PADDLING marks a superior crew, and they can push the delicately balanced outrigger canoe through the water at speeds up to 10 miles an hour. A recent race from Catalina Island to the mainland took four hours

THEY'RE NOT SINKING; this crew is just hidden behind an ocean swell as they fight for their lead in the race. The extra figure is in a small outboard

SWAMPED, but not defeated, a crewman bails furiously to empty the canoe and get back into the race. To accept any assistance would disqualify the canoe

Vitamins Pep Up Old Books

INJECTING THE PAGES of rare and ancient books with vitamins to heal the crumbling fibers, monks in a Roman abbey are restoring priceless and irreplaceable treasures.

Chiefly the work of Don Mario Pinzutti, head of the Institute of Scientific Book Restoration, located near the Vatican, it involves analyzing the paper and inks, then injecting each page with a solution of vitamin PP and protein. This gives the pages greater flexibility. The paper is then submerged in a chemical bath which strengthens it before rebinding.

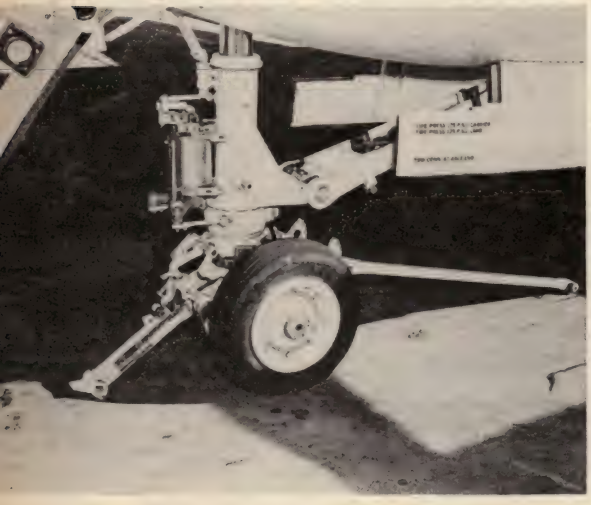
Many valuable documents, some dating back to the year 1000, have been saved by the process. The institute was founded by the late Pope John and continued by his successor, Pope Paul. Many unsuccessful experiments preceded the final solution.

DON MARIO injects vitamins and proteins into leaves of ancient manuscript, after first studying them under microscope to determine their composition

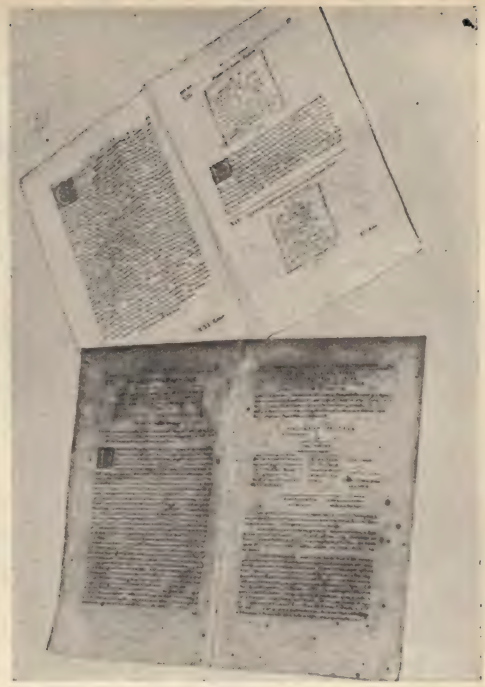
New Nose-Tow for Navy Carrier Catapults

Replacing the old wire-cable bridles used for launching aircraft from carrier decks (see *Riding the Navy's Floating Slingshots*, page 84, June *PM*), a new nose-wheel tow eliminates a five-man launching crew as well. It consists of a steel T-bar that drops into a special fitting mounted on the standard catapult shuttle. The plane merely needs to be guided onto it. When sufficient tension is developed, a release element snaps and the plane is shot down the deck.

The old system used a second cable under the tail to hold a plane until release.



CHEMICAL BATH is used for leaves after they have been injected to strengthen them. It also cleans them up, removing spots from ancient parchments



BEFORE AND AFTER shows difference in pages which have been treated (top) from those which are still in unrestored condition, prior to vitamin treatment

Pest Pacifier

Assailants can be warded off and marked for police identification by using a 2½-oz. aerosol which sprays a harmless chemical that irritates eyes, nose and throat. Made by American Jet Spray Co., Denver, Colo., "re-Pell" also contains a dye visible only under ultraviolet light. Price: $3.95.

Arm Power for Handicapped

A patient with a paralyzed arm can eat and shave with the help of a research device developed at Cleveland's Case Institute. A powered splint controlled by a computer makes his arm move. The computer is activated by switches on his forehead that respond to eyebrow movements.

Is Aviation Going AUTOMATIC?

New electronic aids all but eliminate pilots, flying planes almost from takeoff to touchdown

By Hans Fantel

FOG HAD CLOSED every airport in the New York area. Except one—a specially equipped airstrip at Teterboro, New Jersey, used for testing Microvision, a new device for landing aircraft in any kind of weather.

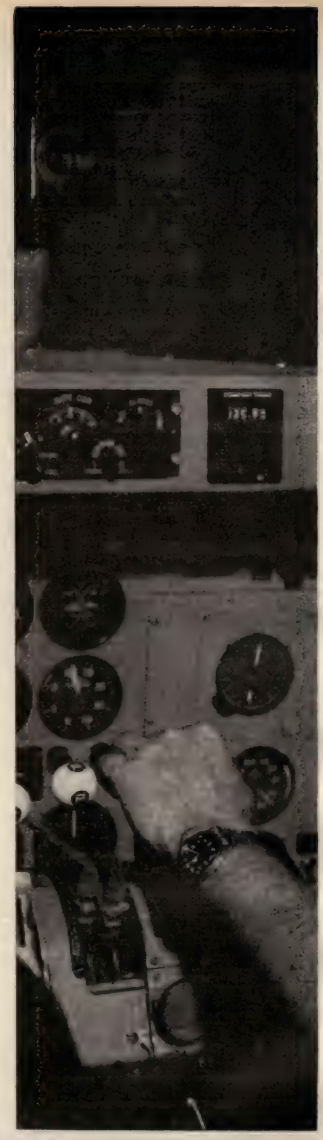
"Ceiling zero, visibility zero," crackled the loudspeaker in the cockpit of the venerable DC-3 that the Bendix Corporation was using to check out its new landing aid.

"Perfect!" grunted test pilot Earl Fredrickson. "We can't see a thing." Off we roared into the paste-gray miasma. In the co-pilot's seat I got an eerie feeling that we were flying through the inside of a featherbed.

"Now let's try to get down again," said Fredrickson. Finding the airport was no problem. We just zeroed in on the radio beacon, making a standard instrument approach. But the regular ILS (instrument landing system) takes you down only to 200 feet. From then on, you're on your own.

"Here's where Microvision comes in," the pilot said over the intercom. He reached up toward a kind of TV receiver mounted above our heads and flipped down a pair of hinged glass panels—one in front of him; one for me. Suddenly, in these opaque "windows," we saw runway lights in the distance, just as they would appear in clear weather.

What we saw, however, were not actual runway lights, but an electronically simulated display on the small panels. No real



LANDING AID, called Microvision, projects two rows of lights that outline runway onto glass panel before pilot's eyes. Since panel is transparent, pilot can look right through it and see runway as it gradually becomes visible through fog. Transmitters buried along runway send signals

light could have penetrated the thick fog.

As we got closer, the perspective of the lights changed in a completely natural, realistic way, as if we were actually looking at the runway from the approaching plane. Two additional navigation aids appeared in our field of vision: A horizon line to indicate our attitude (nose up or nose down) and a vertical line to mark our heading relative to the center line of the runway. With the addition of those two lines to the display we could aim the plane at the runway as through a pair of crosshairs in a gunsight. It all seemed so natural I almost forgot that we were flying totally blind.

The landing was a snap. The electronically produced "runway lights" in the display had gradually crept up to the simulated horizon line as we swooped downward. When the lights reached the horizon line, we knew that we were almost level with the runway. Fredrickson pulled up the nose for the final flareout of his landing run. A moment later a soft thud confirmed a perfect touchdown.

Microvision is only one of several electronic devices designed to solve problems that persistently plague aviation, both enroute and during landings. Foul-weather landing is one of the oldest headaches. And new ones have sprung up with the jet age. The sheer speed of today's planes and tomorrow's SSTs (supersonic transports) raises new problems in transocean flying, where ground guidance from shore-based radio beacons is only marginal. The new electronic flying aids have successfully tackled these difficulties. Blind-landing systems are still experimental; but self-contained navigation devices, independent of ground support, already are guiding over-water flights.

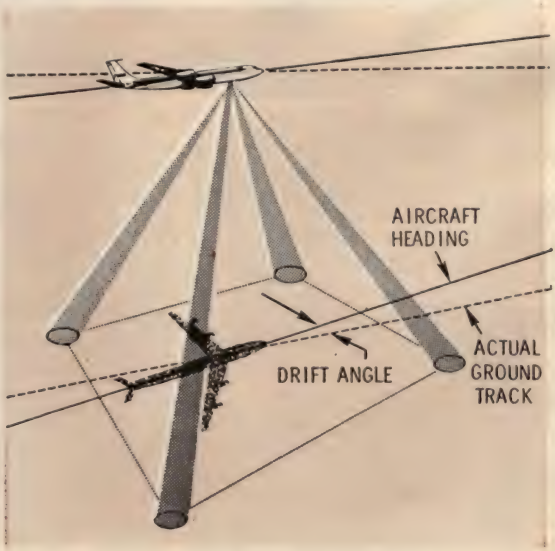
In principle, Microvision is distantly related to TV. Microwave signals are made visible on the screen of a cathode ray tube. Six small transmitters spaced along the runway send out narrow beams of these signals like invisible searchlights penetrating the fog. One pair of transmitters marks the start of the runway, another the middle, and the final pair marks the end. A special receiver in the nose of the plane picks up these signals through highly directional antennas that pinpoint the location of each runway transmitter. Thus they receive an electronic image of the runway outline, which then appears on a cathode ray tube screen. From there, an optical system projects the image onto the transparent display window.

"It's a heads-up display," explains John Lauricella, the development engineer who nursed Microvision to its present advanced state. "The pilot doesn't lose vital seconds looking back and forth from windshield to instrument panel."

TWA recently demonstrated a system

DOPPLER PANEL display gives pilot running account of speed in knots and drift angle in degrees. Miles left or right of course are shown at bottom

DOPPLER SYSTEM sends out four signals. Difference in frequency of return signals tell speed and drift angle. Information is fed automatically to autopilot



that goes one step forward. Microvision is merely a visual aid to the pilot who is still flying the aircraft. TWA's Auto-Scan actually flies the airplane, through the autopilot, down to within 1200 feet of the end of the runway and 100 feet above the ground. At this point the pilot, theoretically, can see the runway lights and take control manually.

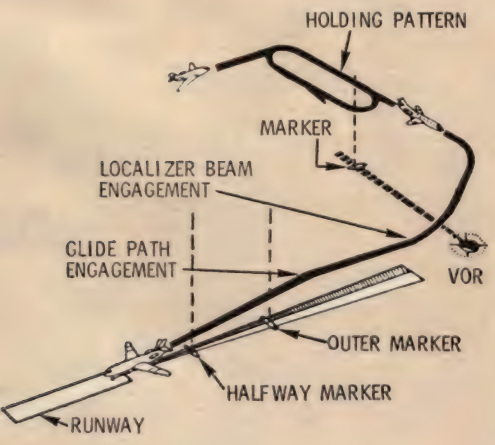
Auto-Scan "locks on" to the ILS, aligning the aircraft for proper direction and rate-of-descent, and adjusting the throttles during the approach for proper speed. At any point, the pilot can override the system if necessary.

Two more systems take the third step.

The more radical approach to landing problems has been worked out by the British. Their system, called BLEU (Blind Landing Experimental Unit) lets you land without even looking. In fact, the pilot just sits with his hands in his lap. An electronic computer, interpreting signals from two ground-based transmitters, is linked directly to the plane's autopilot and guides the aircraft all the way to touchdown. To guard against slip-ups, three separate computers are carried aboard, each checking the accuracy of the others.

Passengers won't be able to tell who—or what—is flying their plane with BLEU. Not even the moment of touchdown tells whether the landing was made by a pilot or a computer. "BLEU always gives you an average landing," says Raymond Bray, a British pilot who has flown BLEU tests for three years. "It's never cream-smooth, never rough—just a normal bump or two."

AUTOMATIC LANDINGS, completely "hands off," are accomplished through autopilot, locking on to localizer and glide-path signals in Sud-Lear system



A likely competitor in this bracket is the Sud-Lear system, developed jointly by Sud-Aviation in France and Lear-Siegler Corp. in the U.S. It is now being tested in French Caravelle jet liners. Here, too, ground guidance grabs the plane at 200-foot altitude (at the end of a standard ILS approach when the plane is already lined up with the runway) and brings it down on a glide path within 50 feet above the ground, then pulls up the plane's nose into a flare-out for landing. Engine throttles are automatically controlled to assure a stall point inches above the runway.

United Air Lines, which has been testing the Sud-Lear system on its twin-jet *Caravelles*, may be the first American airlines to employ all-automatic landings.

Pilots Are Skeptical

Despite thousands of successful tests of autoland systems, most airline pilots sniff at the notion of letting a gadget land their plane for them. They just don't like the idea of staking their own and their passengers' lives on a robot's judgment.

"Such objections are emotional rather than rational," muses one British airline executive. "Naturally the pilot resents just sitting their idly during the most critical 20 seconds of his flight. But the fact is that today's jets already are virtually automatic. The pilot just monitors while the autopilot does the actual flying. Automatic landing is the inevitable extension of electronic progress."

A battle seems to be shaping up between proponents of "hands-off" autoland systems and the partisans of pilot control with electronically provided visibility.

By contrast, things are fairly settled in the second major area of new electronic flying aids—self-contained navigation systems for enroute flying. These devices have successfully solved another jet-age problem: the navigation of high-speed aircraft over oceans and deserts.

"On overland routes, you just follow the established airlanes marked by radio ranges," explains Capt. Gordon Granger, chief of research and development at Trans World Airlines. "But we have lots of trans-Atlantic flights, and there are no radio

(Please turn to page 216)

Quick-Release Back Pack

U.S. Marines may soon be replacing their canvas back packs with a 13-ounce nylon version that is three times more durable at one-third the weight. The XM-1964 also features quick-release shoulder straps for easy removal.

Lowest-Powered Rocket

Capable of being throttled as low as five ten-thousandths (.0005) of a pound of thrust (the smallest yet for a high-performance propellant system) a tiny rocket will make slight position changes in space vehicles. It's by United Technology Center.

Low Road or High Road—It Doesn't Matter

Warner Brothers—not Detroit—is responsible for one of the strangest cars ever built. It's called Hannibal 8 and will appear in a movie about a fictitious old-time auto race. Powered by an 80-hp. engine, Hannibal is designed to be a winner. It has a cannon for stopping competitors and a smoke screen generator. A hydraulic mechanism allows the body to scissor into the air (left) in crossing streams.

Polaris Missiles Launched from Nuclear Subs While Surfaced

Designed originally to be launched from submerged submarines, Polaris missiles can be shot from surfaced submarines as well, recent tests proved.

The debris flying through the air in the picture are launch adapters designed to detach themselves immediately, once the missile has left the tube.

The submarine is the USS *Henry Clay*, and its slight port list is standard in surface launches. Thirty minutes earlier, it had launched another Polaris while submerged.

Mobile Easy Chair Runs on Battery Power

Wheel around village, yard, golf course —you name it—in solid comfort, at speeds of one to 15 m.p.h. A new little electric car with fiberglass body, molded to fit people, boasts six speeds forward; six reverse. Two batteries yield 1½ hp.—enough to buck snow or climb a ramp. Plug it into house current for recharge. The basic "Reddy-Go" is $495 from American Battery Car Inc., Middlebury, Ind.

Buyers' Guide to Shortwave

Amateur or all-wave? $39 or $150? And how much of that alphabet soup of extras do you need? Try these shopping tips

By Larry Steckler

TO TAP THAT WORLD of airwave adventure surrounding you—police calls, marine communications, satellite signals, radio amateurs, aircraft or foreign broadcast stations—you may think that you need only to switch on any shortwave radio receiver.

But step into a radio showroom, or leaf through the radio receiver pages of an electronics catalog, and you enter a world of confusion.

Suddenly, you're surrounded by amateur and "all-wave receivers" ranging from $39.95 to over $500 in price—not to mention a veritable adphabet soup of mysterious abbreviations (BFO, ANL, AVC, Q multipliers, to name a few) which may or may not be important to the type of shortwave listening you have in mind. We'll try and sort out the significance of

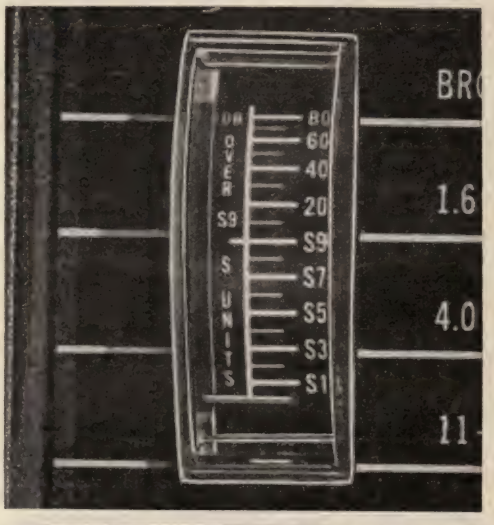
Receivers

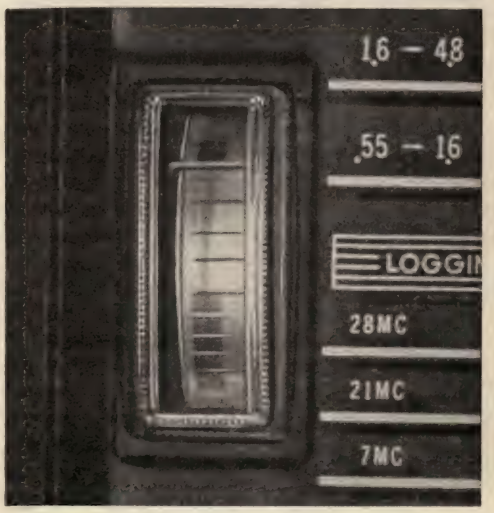
these alphabet extras for you in this article.

Before you walk into the showroom you should decide what type of listening you intend to do—amateur radio or general-purpose "all-wave" shortwave listening. The amateur receiver concentrates on the amateur radio bands at 3.5-, 7-, 14-, 21- and 28-megacycles. The bandspread dial on these sets is calibrated for these bands.

The general-purpose set, on the other hand, carries labels at around 1.6-mc. (1600 kc) for police radio, 2.5-mc. for ship-to-shore phones, as well as amateur frequencies and the most commonly used foreign-broadcast frequencies.

It is interesting to note that the 1.5 to 4-mc. area is generally good for reception up to 300 miles and nighttime listening. From 4 to 8-mc., expect 300 miles daytime





S-METERS MEASURE signal strength. Standard types (top) are easiest to read and large scale makes them most accurate. Current trend is to smaller vertical dial. Avoid the uncalibrated ones (center)

What the Shortwave Dollar Will Buy

PRICE: Under $75 FEATURES

4 bands
No r.f. stage
540-kc to 30-mc
May not have S-meter
Fixed frequency BFO
May not have headphone jack

PRICE: Under $100

4 bands
May not have r.f. stage
540-kc to 34-mc
S-meter, but may not be calibrated
Fixed frequency BFO
Headphone jack
May have basic Q multiplier
May have basic noise limiter

PRICE: Under $150

4 bands
R.F. stage
540-kc to 34-mc
25:1 tuning ratio
S-meter
Automatic noise limiter
BFO, may be fixed frequency circuit
Antenna trimmer
Headphone jack

PRICE: Under $200

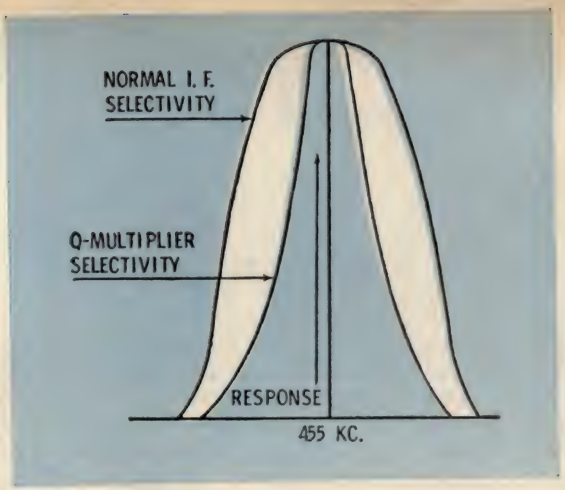
5 bands
R.F. stage
540-kc to 34-mc
30:1 tuning ratio
Calibrated S-meter
BFO with pitch control
Automatic noise limiter
Basic Q multiplier
Dual conversion
Antenna trimmer
Headphone jack

PRICE: Under $300

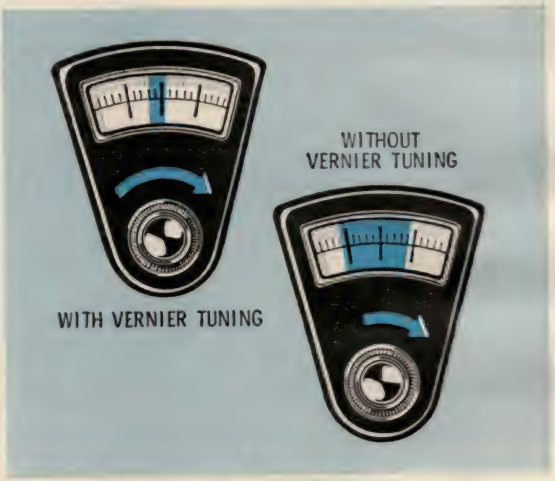
5 bands
R.F. stage
540-kc to 34-mc
60:1 tuning ratio
Calibrated S-meter
Variable i.f. selectivity
Noise limiter automatic
Automatic volume control
Single-sideband reception
Dual conversion
Antenna trimmer
Headphone jack

PRICE: Under $450

6 bands
2 r.f. stages
540-kc to 109-mc
AM and FM (27-MC to 109-MC)
60:1 tuning ratio
Single sideband reception
Automatic volume control
Automatic noise limiter, adjustable
Triple conversion
Adjustable i.f. selectivity, notch filter
Plug-in crystal tuning
Push-pull 10-watt audio output
Clock timer
Antenna trimmer
Headphone jack



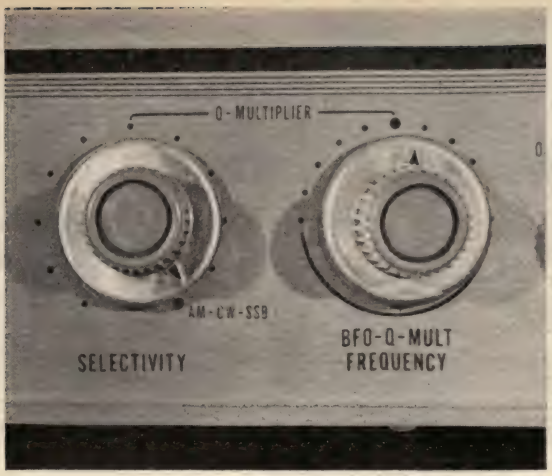
Q-MULTIPLIERS narrow bandpass of the i.f. amplifiers resulting in greater selectivity in the receiver. Means more stations and less jumble to you



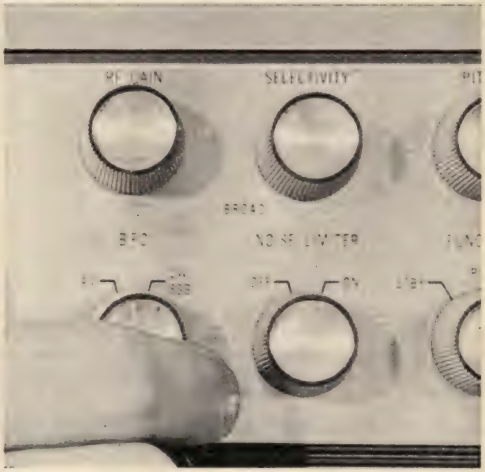
QUARTER TURN of high-ratio dial at left covers less tuning distance (colored band) than same turn of low-ratio dial at right. Simplifies tuning

and up to 1500 miles at night. From 8 to 14-mc., look for under 2000-mile range during the day and over 2000 miles at night. For 14-mc. to 34-mc., expect 1500 miles or more with best results in the early morning or evening.

Portable all-wave sets are usually transistorized and come with a built-in pole-type antenna. In general, they will not perform as well as a nonportable receiver selling for the same price. The built-in antenna can only deliver a small fraction (as little as one tenth or less) the signal picked up by a long 150-foot single-wire antenna. Also the portable's transistor cir-



UNTIL RECENTLY Q-multiplier circuits were only available as accessories (right). Now they are being incorporated into design of newer sets (left). They help separate shortwave stations that are crowded together and overlapping



PRESELECTOR can really bring in long-range broadcasts. This extra tuned r.f. stage is found in only the very best and most costly shortwave receivers

CLUSTER OF CONTROLS looks impressive; and noise-limiter knobs are switches, do not adjust. R.f. gain and selectivity controls are not calibrated

cuitry is inherently noisier. When you are listening to a strong station, this noise cannot even be heard. However, tune in a weak distant signal and you may find yourself getting more noise than signal. For best performance for the price, then, stick to a nonportable vacuum-tube type receiver.

Speaking of price, a key difference between rock-bottom $39 sets and more expensive ones is that cheaper sets usually have fewer tubes.

When comparing receiver performance in the store and trying some of the tests mentioned in this article, ask the salesman to be sure that the sets you try are all connected to the same antenna. Most stores have a setup for switching any radio on display to a particular antenna. But if you really want to play it safe, don't rely on the switching. Try one set plugged into one particular antenna jack, then unplug it and hook up the next one. A good set hooked to a poor antenna will not perform as well as a poor set connected to a good antenna.

Three main factors determine quality. They are stability, sensitivity and selectivity.

Stability refers to the set's ability to stay

SLIDE SWITCHES always look neat but frequently lead to trouble. They are more likely to break down and require replacement or service than standard toggle switches

tuned to a station and not drift off frequency. Check by tuning in a weak station for 10 minutes or so. The station may fade in and out (volume level may change) but you should not have to touch the tuning control again.

Sensitivity is the ability of a radio to receive a weak station. Check by tuning in the same weak distant station on several sets. If one delivers a stronger, clearer signal than the rest, it's the most sensitive set.

Selectivity is the receiver's ability to pick out one station from a group of stations crammed tightly together. Tune a receiver to a crowded portion of any band. Then, using the bandspread control, see how many stations you can sort out of the jumble. Test several sets this way. The one that most easily tunes in the largest number of stations is best.

The alphabet soup. Almost all shortwave radios include a headphone jack and an S-meter. The jack should be mounted on the front panel for easy access. Headphones are a must for good listening to weak or distant stations, and adding a jack to a set that doesn't have one can sometimes be difficult.

If you start collecting QSLs (confirmation cards from the stations you listen to), you want the S-meter to give you a signal-strength reading to relay to the station when asking for a card. But the S-meter should be calibrated and have a large easily read dial. If you have a real basic set that does not include an S-meter, there's an accessory meter you can add.

Noise limiters are electronic circuits intended to protect your ears against sudden loud bursts of static. Almost all receivers above the economy class include such a circuit. Automatic noise limiters (ANL) are handy, but should have a sensitivity control so you can select the point at which they go into operation; an On-Off switch is not enough.

To compare such circuits, tune to a noisy spot on the dial, then flip in the circuit and judge how effectively the noise level is cut back, without eliminating the station

(Please turn to page 226)

KNOW YOUR RECEIVER FEATURES

R.F. STAGE	Radio frequency amplifier located ahead of other receiver stages. If you want really long-range reception make sure your receiver includes this circuit. Best sets have 2-stage circuit (preselector)	**VARIABLE SELECTIVITY**	Electronic circuit that adjusts bandwidth of i.f. stages enabling reception of weaker more distant stations. Look for range of adjustment and crystal filters. See diagram on page 118
S-METER	Signal-strength meter. Look for large calibrated dials and a long scale. Vital if you intend to obtain QSL cards. Large dial eases tuning and taking accurate signal-strength readings for QSL's	**ANL (AUTOMATIC NOISE LIMITER)**	Circuit designed to reduce background noises of all types. A real help if you live in an area where a lot of electronic static is present. Look for a sensitivity control if circuit is not automatic
TUNING RATIO	Ratio of distance tuning control knob turns to distance station selector dial actually moves. Larger the ratio, the more selective your tuning. See the diagram on page 118 for greater detail	**ANTENNA TRIMMER**	Matches receiver input to antenna for best performance. Look for front panel control. It often helps to readjust trimmer after tuning station. Brings the desired station up out of the clutter
BFO (BEAT FREQUENCY OSCILLATOR)	Absolute must if you intend to listen to Morse code broadcasts. Keeps tone of signal constant making code reading easier. Look for a variable pitch control so you can select the tone you want	**HEADPHONE JACK**	A must for listening to distant stations. Phones eliminate otherwise distracting local noises. Look for front panel jack. Other locations are not as convenient. Found on almost all receivers

Laughing Tables

Sealed in plastic tabletops, dozens of characters from famous comic strips clown for Fred Waring's friends in a unique "Cartoon Room"

WALKING DOWN the long corridor to the taproom beneath the lobby of Fred Waring's hostelry at Shawnee, Pennsylvania, is a pastime designed to provide chuckles.

Actually, it's like wading through the family room on a Sunday afternoon, after the kids have dismembered and abandoned the comic sections from every newspaper in the neighborhood. Original drawings of familiar funny faces peer, leer and grin from the walls.

In the taproom itself, bristle-headed little *Nancy*, the *Katzenjammers*, *Mr. and Mrs.*, the *Little King* and scores of

FAMILIAR FACES from the nation's most famous comic strips, gaze at customers from table tops in the Cartoon Room of Fred Waring's famous Inn

other comic strip characters, lie uniquely imbedded in plastic on every table top, as well as in an array of plastic panels on the stage. Legends in the balloons sing the praises—and kid the golf game—of the Inn's famous host. "The Waring Keep-Your-Head-Down Machine" is the label on Rube Goldberg's sketch of a system involving bees, buckets, balloons and dropping people—"Such a good friend for such a long time," Steve Canyon comments.——"Wow! What did I just hit?" asks Mutt, fanning a ball; "Shawnee on the Delaware," explains Jeff.

All the fun began about 20 years ago when Fred Waring brought a group of song pluggers and cartoonists to Shawnee for a get-together. Since then, on what has now become an annual pilgrimage, nearly every American cartoonist whose work appears in print regularly, anywhere, has wound up chipping and putting on the banks of the Delaware. Nearly all have left behind an original painting of their comic characters—in jest or jibe—to their buddy, "Fred."

Trickiest of all the cartoons on view are those that form the tops of the nearly 100 (to date) tables in "The Cartoon Room." How do you protect a three-foot-square painting on a table top—in a public dining room—from vanishing under gravy stains? You invent a way.

Fred Waring's name was not associated with a "Blendor" for nothing. Among members of his troupe of "Pennsylvanians," he is notorious for spattering unique practical ideas in all directions all the time. His home, as well as the Inn at Shawnee, are a-bristle with Waring inventions and designs. Creations run from sliding shoji-screen "draperies" in his bedroom and an A-frame tree house for his young son (you'll see it soon in *Popular Mechanics*), to the vari-colored giant polka-dotted carpeting in the hotel's lobby.

Making table tops out of original cartoons presented no outstanding problem to Waring. "I figured," he says, "that if the makers of kitchen countertop material could seal multi-colored patterns in their tough plastic laminates, they should be able to process king size comic strip subjects the same way."

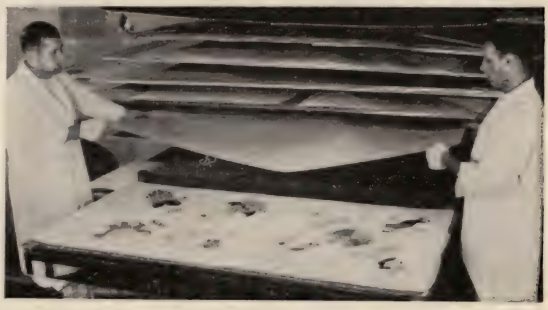
Out went the query from Waring Enterprises. At Parkwood Industries in Wakefield, Mass., the answer was: "Why not?"

(Please turn to page 214)

MILT CANIFF sketches outline of a table top Steve Canyon for the Waring collection. Drawing is made on treated paper with special ink for laminating

PLASTIC SANDWICH is made up of seven layers of kraft paper soaked in phenolic resin. Next comes cartoon design sheet, topped by melamine resin sheet

CARTOON DESIGN sheet for table tops at Shawnee is covered with melamine impregnated paper that will become hard, transparent plastic surface in hot press



MUTT AND JEFF table top in the Cartoon room carries funny legends kidding the golf buffs among the song pluggers and cartoonists who convene at Shawnee

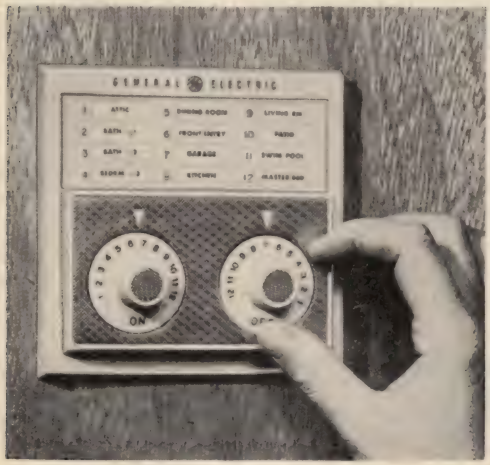
RUBE GOLDBERG'S "Keep-Your-Head-Down" machine for golfer Waring involves complicated mechanism using bees, balloons, pedal tripper and head spanker

SHAWNEE ON THE DELAWARE!
WOW! WHAT DID I HIT JUST NOW?
I'M NOT PLAYING MY USUAL GAME TODAY!
WHAT GAME DO YOU USUALLY PLAY, MUTT?
WHAT ARE YOU DOING WITH MY DRIVER?
I'M DRIVING A WELL!
DO YOU KNOW THE DIFFERENCE IN LEARNING TO PLAY GOLF AND LEARNING TO DRIVE A CART?
YEH, WHEN YOU LEARN GOLF YOU DON'T HIT ANYTHING!

BOUDOIR CHAIR becomes ironing and beauty center when water repellent cover is unbuttoned. Ironing board lifts out of back of chair; steam iron and hairdryer are under chair seat. Also included in this space-saver unit: cord and plug connections for electrical outlets. Price: $129.95. Castro Convertible, New York, New York

New for Your Home

MASTER SWICTH runs 12 lights by remote control on low-voltage system. Lights, whether indoors or out, are turned on or off at once, or individually as dialed; directory shows which ones are on. Made by General Electric Co.



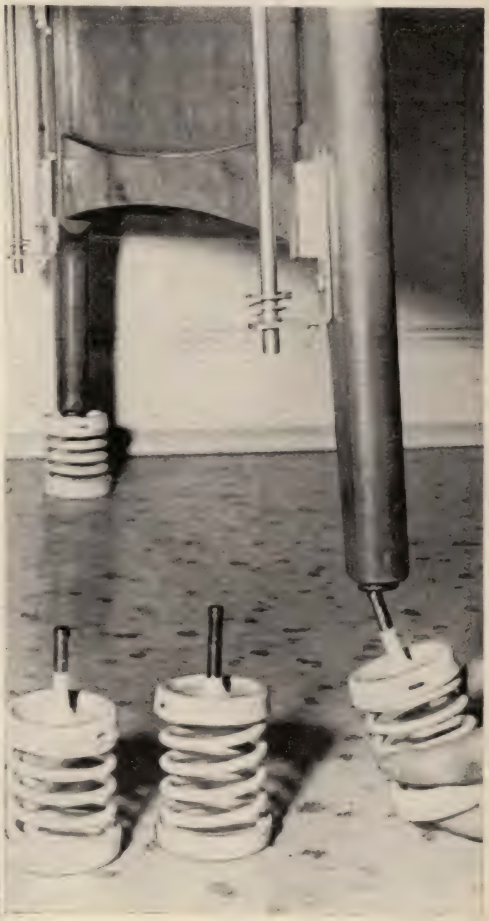
WARMING TRAY with built-in cold spot operates electrically. Fiberglass, portable waterproof unit weighs under 3 lbs., works for hot and cold foods simultaneously. Price: $20; by Kimberly Products, Phoenix, Arizona

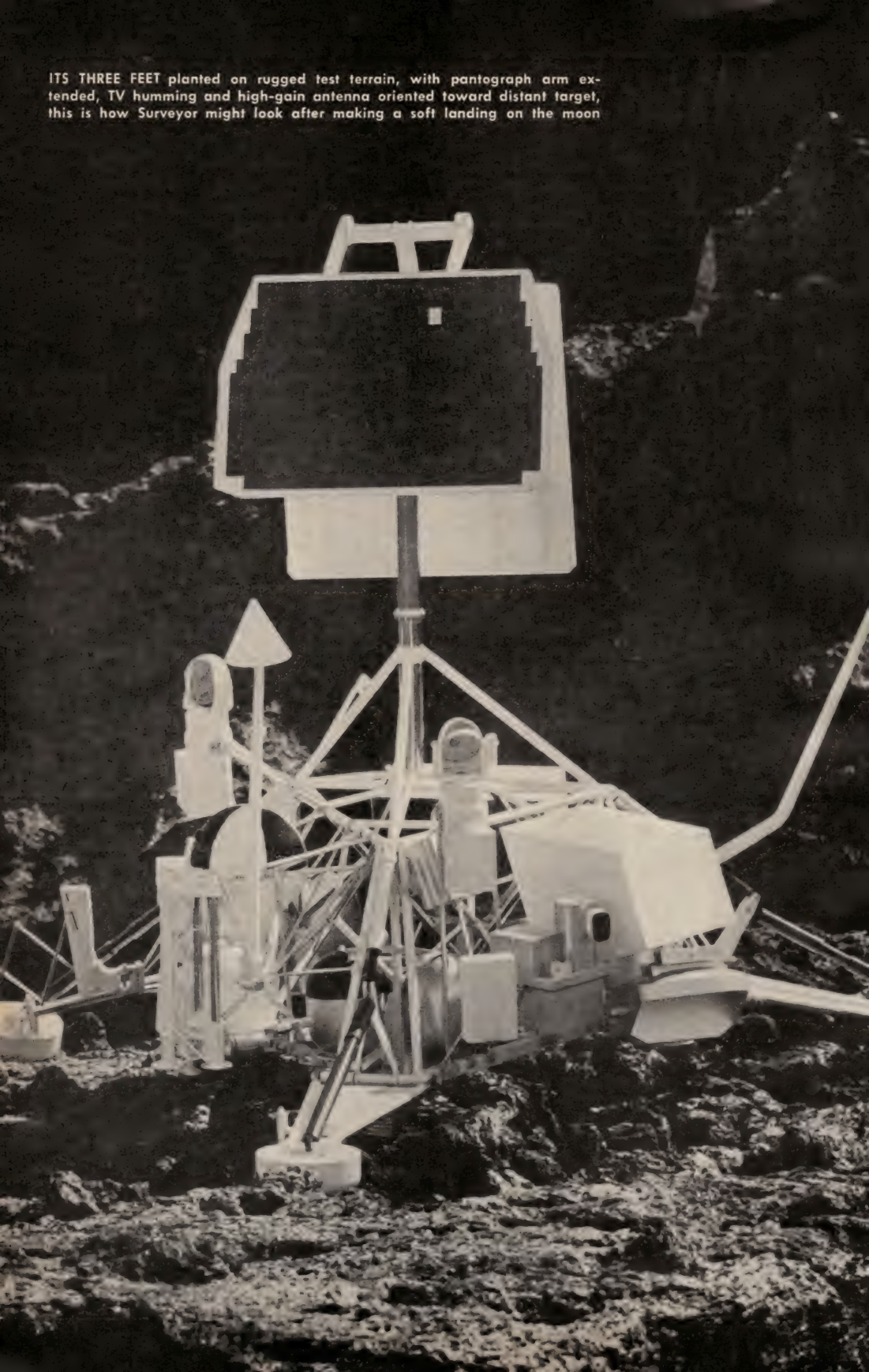
SHOE RACK adjusts automatically to all sizes and types of shoes, keeps soles flat. Of aluminum and black plastic, 7 by 14-inch unit screws or tapes to closet door. Available at $5.95 from Hammacher Schlemmer, New York, N.Y.

CRIB CASTERS substitute springs for rollers or wheels, let child rock himself to sleep. Simply pry out regular casters, snap on noiseless and non-toxic ones. Price: $3.95 a set. Syro Industries, 1427-29 S. Halsted, Chicago, Ill.

CLUSTER TABLE separates into six serving units that stack for storage. As cocktail table, it's 36 inches across. Stainproof, in teak or walnut patterns, set is $32.50. Ulltra Decor Products, 600 W. Main, Canfield, Ohio

CASTERS rest in, not on, carpet. For heavy, often-moved furniture, the differential swivel action resists pulling or twisting of pile. Molded nylon wheels cost $6.45 for four. U.S. Caster Corp., 1630 Oakland, Kansas City, Missouri





ITS THREE FEET planted on rugged test terrain, with pantograph arm extended, TV humming and high-gain antenna oriented toward distant target, this is how Surveyor might look after making a soft landing on the moon

Our First Moon Scout Heads for the Pad

This year a talented robot will try to "check out" the moon. Called "Surveyor," he's got three legs, electronic eyes and chemical senses

By Thomas E. Stimson, Jr.

BEFORE WE TRY to place human explorers on the moon, we are going to send up mechanical men who will land on their three feet, look around and tell us what they see.

After one of them has touched down, he'll report what the lunar surface is like. He'll scratch the ground with one hand to learn whether it's hard or soft. He'll reach out with another hand to feel if micrometeorites are showering down.

This mechanical American will be pretty human in other ways, too. His eyelids will close during landing, to keep dust out of his television eyes. If he suffers too much from the searing heat of the lunar day, he'll adjust his interior temperature. He'll go to sleep when the sun goes down, shutting off all of his senses except his sense of feel for moonquakes, and use stored-up battery energy to avoid freezing to death.

As a photographer, this extraordinary American will take stereo pictures and transmit them back to earth so we can see what he sees, in three-dimensional color.

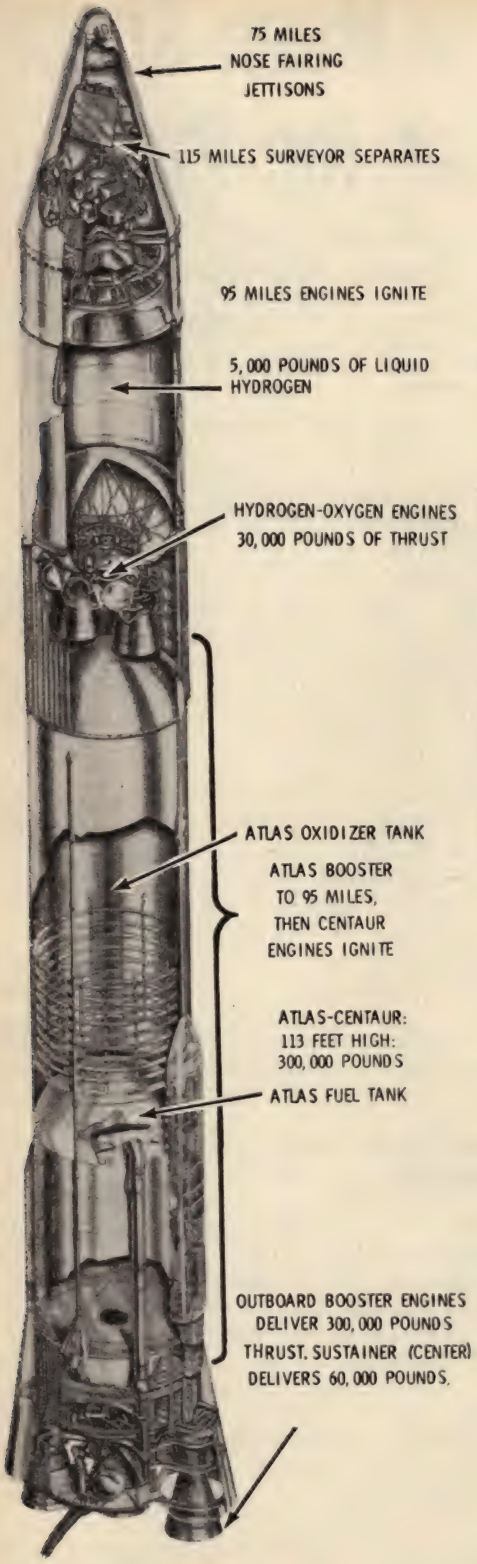
The name of this mechanical man is Surveyor. And, to carry the simile one step further, his father is Caltech's Jet Propulsion Laboratory and his mother is Hughes Aircraft Company. Both parents expect great things of their offspring.

The first Surveyor, in a planned series of at least seven attempts, will leave for the moon later this year. The project is the last exploratory step before Apollo, the manned spacecraft that is scheduled for a moon landing in the early '70s.

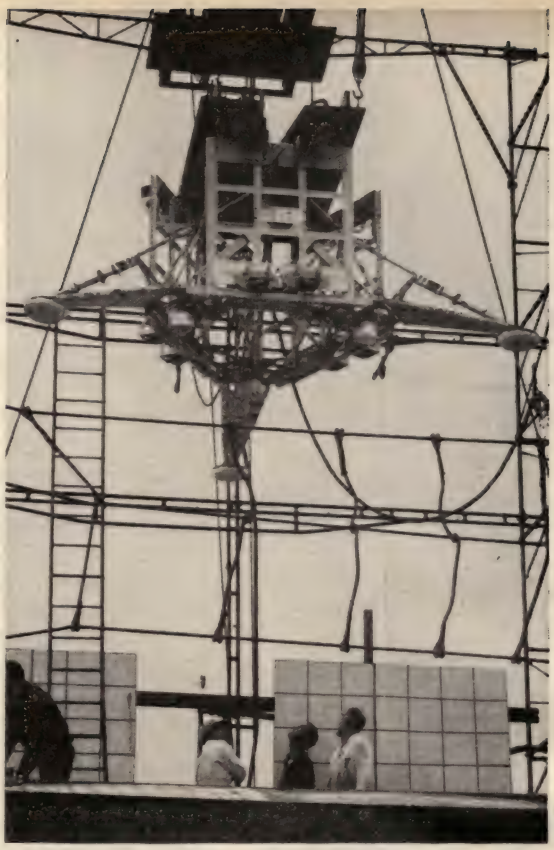
Suveyor's role is to provide us with answers to questions such as these:

- *Is the moon covered with a layer of dust? If so, how deep is it?* (Despite radar information and close-up photos taken by Ranger VII, this question continues to generate controversy. Several scientists connected with the Ranger project maintain that the lunar surface is essentially firm. Other scientists with equally good credentials say just the opposite; they think the dust is deep enough to swallow up a space vehicle.)
- *Will moon dust clog mechanical parts or even turn an Apollo spaceman into a walking dust ball?* (There's some evidence that dry dust in a high vacuum tends to collect and cling to any surface.)
- *Are tiny meteorites constantly raining down on the moon?* (With no atmosphere to slow them down, the high speed particles could slice through a space suit or even the spaceman himself.)

But the first four Surveyors won't come up with all the


75 MILES
NOSE FAIRING
JETTISONS
115 MILES SURVEYOR SEPARATES
95 MILES ENGINES IGNITE
5,000 POUNDS OF LIQUID HYDROGEN
HYDROGEN-OXYGEN ENGINES
30,000 POUNDS OF THRUST
ATLAS OXIDIZER TANK
ATLAS BOOSTER TO 95 MILES, THEN CENTAUR ENGINES IGNITE
ATLAS-CENTAUR: 113 FEET HIGH: 300,000 POUNDS
ATLAS FUEL TANK
OUTBOARD BOOSTER ENGINES DELIVER 300,000 POUNDS THRUST. SUSTAINER (CENTER) DELIVERS 60,000 POUNDS.

ANATOMY of an Atlas-Centaur. Drawing shows Surveyor cocooned inside nose fairing atop Centaur upper stage, first rocket to use liquid hydrogen fuel

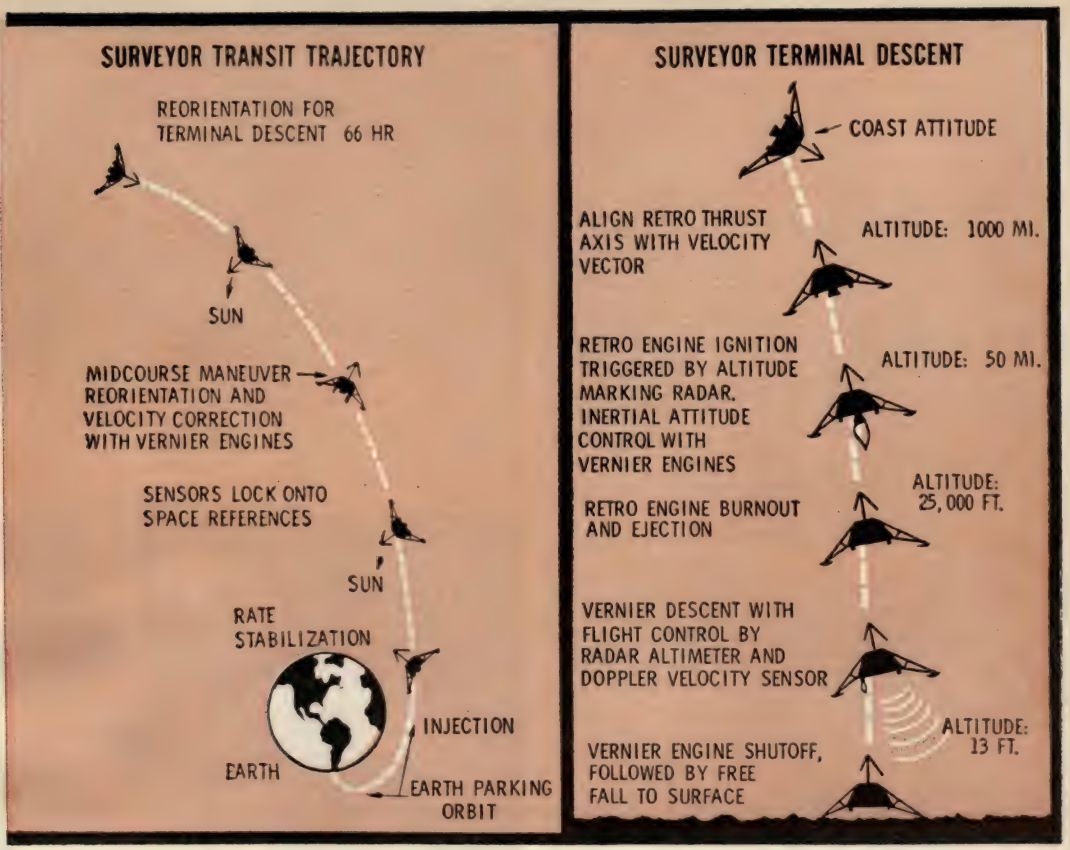


LANDING strength is tested by dropping Surveyor from various heights. Tether arrangement is used to duplicate the one-sixth earth gravity of moon

answers. Instead of carrying the full "lunar laboratory," they'll be outfitted mainly with flight instruments designed to report the accuracy of the approach to the moon, how successful the landing is and, if something goes wrong, exactly what the nature of the trouble is.

Eugene Giberson, Surveyor project manager for JPL, explains that without these pioneer flights there would be no way of correcting a malfunction. So, first the vehicle will be proved out, then the full laboratory will be transported.

Giberson compares the job of making a soft landing on the moon to performing a launch at Cape Kennedy in reverse. That is, the vehicle approaches at high speed, at an angle. Then it must tilt tail-first toward the surface, slow itself down while maintaining perfect balance, then drop in


SURVEYOR TRANSIT TRAJECTORY
REORIENTATION FOR TERMINAL DESCENT 66 HR
SUN
MIDCOURSE MANEUVER REORIENTATION AND VELOCITY CORRECTION WITH VERNIER ENGINES
SENSORS LOCK ONTO SPACE REFERENCES
SUN
RATE STABILIZATION
INJECTION
EARTH
EARTH PARKING ORBIT
SURVEYOR TERMINAL DESCENT
COAST ATTITUDE
ALIGN RETRO THRUST AXIS WITH VELOCITY VECTOR
ALTITUDE: 1000 MI.
RETRO ENGINE IGNITION TRIGGERED BY ALTITUDE MARKING RADAR. INERTIAL ATTITUDE CONTROL WITH VERNIER ENGINES
ALTITUDE: 50 MI.
RETRO ENGINE BURNOUT AND EJECTION
ALTITUDE: 25,000 FT.
VERNIER DESCENT WITH FLIGHT CONTROL BY RADAR ALTIMETER AND DOPPLER VELOCITY SENSOR
ALTITUDE: 13 FT.
VERNIER ENGINE SHUTOFF, FOLLOWED BY FREE FALL TO SURFACE

AFTER 66-HOUR TRIP (left panel), Surveyor will get command from earth to turn and point big retrorocket straight down (right panel). Sixty miles above target, rocket will ignite to slow craft from 6000 to about 400 m.p.h.

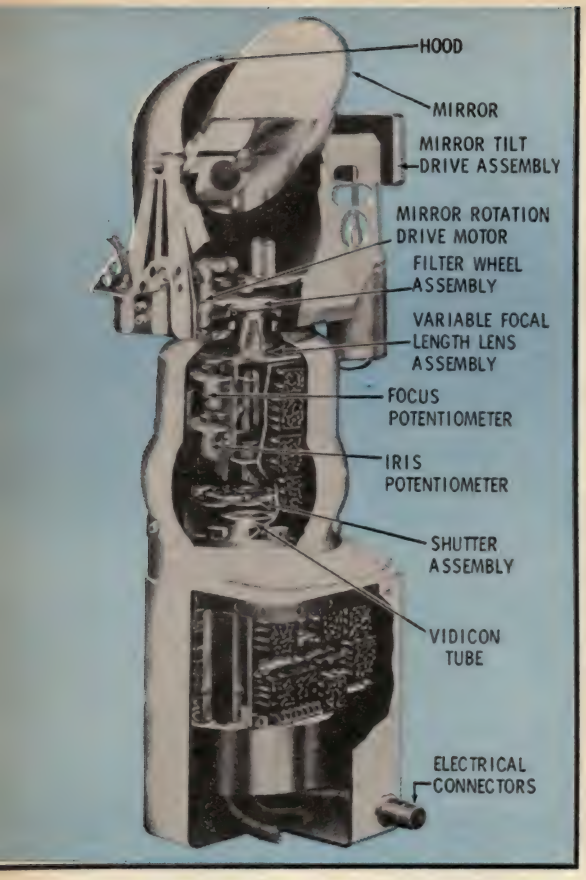
at almost zero speed into the preselected site. And, adds Giberson, Surveyor must do all of this by itself after having spent 66 hours in the hostile environment of space.

Even the blast-off from earth will be more critical than were the earlier moon shots. Ranger VII was first put into parking orbit around the earth, then was fired toward the moon at exactly the right time. This called for relighting the rocket's second stage while in orbit, a tricky operation by remote radio command.

To avoid possible failure, the first Surveyors will be fired at the moon by direct ascent. Each will travel toward a point in space that will be occupied by the moon at the moment the vehicle gets there. The period of time in which the rocket can be launched (the "launch window") is no more than an hour per day at best, on no more than four or five days per month.

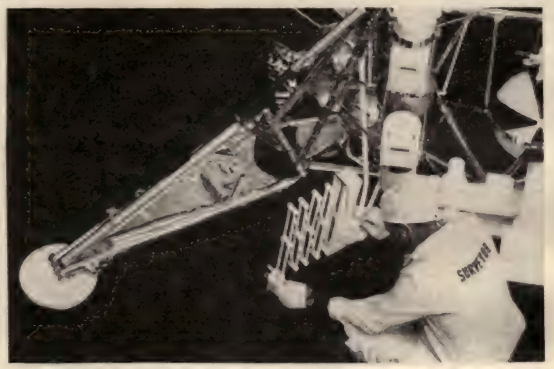
When Surveyor closes to within 1000 miles of the moon the craft will turn (on command from earth) so that its big retrorocket points straight down. At 60 miles altitude the rocket will ignite and push backward with enough thrust to slow Surveyor from its earlier 6000-mile-per-hour speed to less than 400 m.p.h. Explosive bolts that hold the retro case (now burned out) will then free the case and allow it to drop away.

Now RADVS goes to work. (Pronounced "radviz," the initials stand for Radar Altitude Doppler Velocity Sensor.) One RADVS beam projects straight down to measure the altitude and the vertical drop speed. Three other beams, at angles, will measure the craft's speed and direction of travel across the moon's surface. RADVS automatically operates three small vernier gas jets that will cut horizontal travel to zero, at the same time reducing the drop velocity to 12 feet per second. The jets shut off at 15 feet altitude to avoid stir-



CUTAWAY shows one of Surveyor's two TV "eyes." They are designed to take close-ups, scan the horizon and produce stereo pairs for viewers on earth

PANTOGRAPH arm has a reach of four feet, swings right or left on command and is spring-loaded. Its purpose: to help define nature of moon's surface



TECHNICIAN tests arm. It can whack at the lunar crust like a pick and is strong enough to break a half-inch concrete slab or dig hole 20 inches deep

ring up moon dust, and Surveyor impacts at parachute speed.

Being realistic, Giberson expects there may be failures. "If only one of the first four craft makes a successful soft landing, that will be a spectacular achievement," he says.

Surveyor is eight feet tall and its hinged, shock-absorbing legs spread out to a diameter of 13 feet. It is designed to land softly on slopes of up to 15 degrees and has actually landed safely, in rehearsals on earth, on 30-degree slopes.

The first thing Surveyor will do after landing is a little "housekeeping." It will tilt its solar panel to the sun to begin acquiring more electric energy. Then it will orient its high gain antenna toward earth for maximum radio strength.

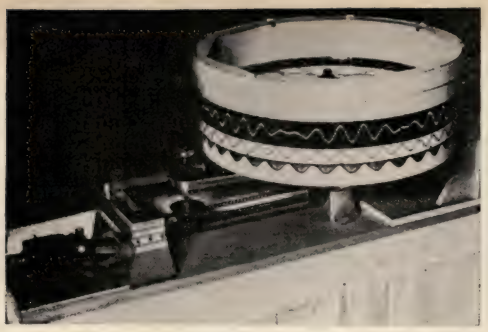
These chores attended to, it will begin accepting and decoding radio commands from earth: "Take a good look at yourself with the wide angle TV vidicon so we can see if you received any landing damage. Now, look down at your legs so we can see whether they are buried in dust."

One Job After Another

Meanwhile, on a different frequency, Surveyor will be transmitting a telemeter report from its 24 touchdown sensors, on such things as time of contact of each foot pad and the force with which each one struck, and whether any sliding or rolling occurred after impact.

From the start, Surveyor has been an exciting challenge to its designers at Hughes Aircraft. To develop a machine that can determine the nature and strength of the lunar surface, provide information for maps, determine seismic activity and even if the moon has a liquid core, analyze the chemical composition of the surface,

(Please turn to page 212)

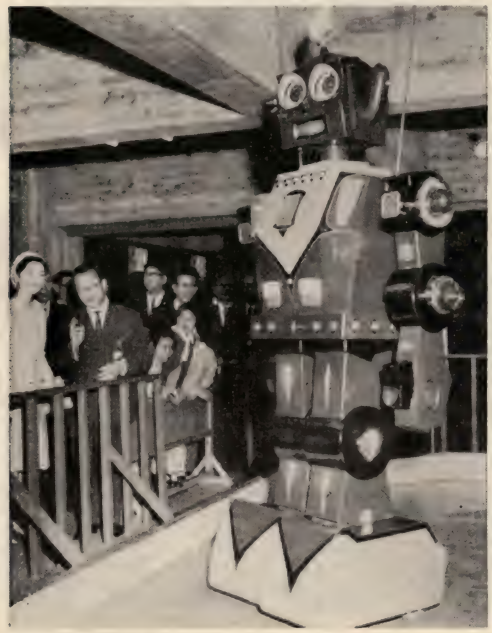


Odd Teaching Machines

Bicycle chains and an array of knitting needles are basic components of machine (above) that demonstrates aspects of "two continuous wave trains." "De-spin" mechanism (right) comes to sudden stop when weights, restrained by cables, fly out and carry away angular momentum. The devices won awards in competition among physicists for new demonstration gear.

Mechanical Baby-Sitter

Goro, a Japanese robot, will follow directions spoken into a microphone, and can repeat the voice of the speaker. He walks forward and backward and can move in any direction. The inventor, Jiro Sagami, claims that Goro can take care of children under a mother's direction.



Tanned to a Turn

Britons may soon be able to get a two-to-five-minute dose of artificial sun from a coin-operated machine called the Solarota. Rays from a five-foot ultraviolet tube play on the customer, who stands on a slowly revolving turntable. The maker plans to sell machines to beauty salons.

The Way-Out World of

What the New Safety Standards Mean

FOR THE FIRST TIME in its 70-year history, the U. S. rubber industry has adopted safety standards for tires. All tires made after January 1, 1965, must pass three performance tests:

1. Strength. *A ¾-inch round steel plunger with a hemispherical end is shoved into the tread of a normally inflated tire. The tire must withstand a specified pressure—different for each tire size—without breaking. This checks a tire's resistance to blowout when it slams against the curb or into a stone or similar object on the road.*

2. Endurance. *A tire is run at 50 m.p.h. against a steel wheel for four hours at 100 percent of the test load specified for its particular size, for six hours at 120 percent load, and for twenty-four hours at 140 percent load. The tire must show no signs of broken cords or of tread, cord, or bead separation. If it passes this test, the tire should be OK for long-trip driving without excessive heat buildup or strain.*

3. High-speed performance. *The tire is run at 50 m.p.h. under the standard load, this time for two hours. After cooling off, it is cranked up to 75 m.p.h. for another half hour, and finally to 85 for a final half hour. A tire that gets by here is presumed safe at any normal turnpike speed.*

On January 1, 1966, a final provision becomes effective. At that time, the actual *size and the nominal size—the size shown on the sidewall—will have to be closer together than they are now. Under the new standard, for example, a tire marked 7.00 will have to be at least 6.7 inches in cross section; one marked 7.50, no smaller than 7.2 inches.*

As far as it goes, the new code is fine. The big weakness comes not in what it says, but in what it does not say. There is no provision for enforcement. Any manufacturer who doesn't want to comply doesn't have to.

"I don't think any reputable manufacturer would jeopardize his market by undercutting the standard," says Firestone senior engineer Jim Corey. Most manufacturers agree . . . but not all. Harry C. McCreary, long-time battler for industry standards, isn't so sure. Says the McCreary Tire Company chief: "The competitive situation being what is in in the tire business, I am extremely pessimistic that any *minimum standards would ever be adopted voluntarily."*

State Senator Edward J. Speno, who introduced tire safety legislation in New York last year, agrees, Voluntary standards, he told Popular Mechanics, *just won't do. "We will not accept industry self-discipline as the answer for what we feel is a need for legislation," he says. "We're going to press for new laws."*

Even if all tire manufacturers stick to the new rules, Speno notes, an overloaded tire still can be as dangerous as a hand grenade with the pin pulled. Yet the new regulations set no maximum loading figures.

Tire loading has been giving some safety experts sleepless nights for a long time —particularly as it applies to station wagons. With two or three passengers and a little baggage, wagons are safe on original-equipment tires. But wagons can be—and are—seriously overloaded at times. Most owners think they'll carry anything you can jam into—or on top of—them. They won't. If loading figures were made a part of tire standards, the customer would be warned. (The test loads used to check endurance are set by a trade group. They're used for design purposes but aren't recommended maximums.)

The tire industry, however, isn't likely to set such loading standards. Car manufacturers now decide which tire goes on which vehicle. And Akron isn't going to knock the car makers. Said one tire man: "Overloading is a pretty touchy subject with us. If we criticize Detroit, we're biting the hand that feeds us."

With all the shortcomings of the new code, it's still a valuable first step. And the door is open for further improvements. "Perhaps in the future these yardsticks will be increased in length and standards set higher," says M. A. Wilson, Goodyear's manager of tire engineering.

Automobile Tires

ROUNDED TREAD SHOULDERS AVOID, tire men say, what they call the "trolley track effect," so wheels can approach obstacles better from an angle. But shape is only the most obvious characteristic of these complex rubber "shoes"

Down-to-Earth Facts About Buying Tires

- *Premium or second line—how they differ in wear and tear*
- *Rayon versus nylon—which is stronger, which wears longer*
- *Pros and cons of glass fiber, radial ply and low profiles*

By C. P. Gilmore

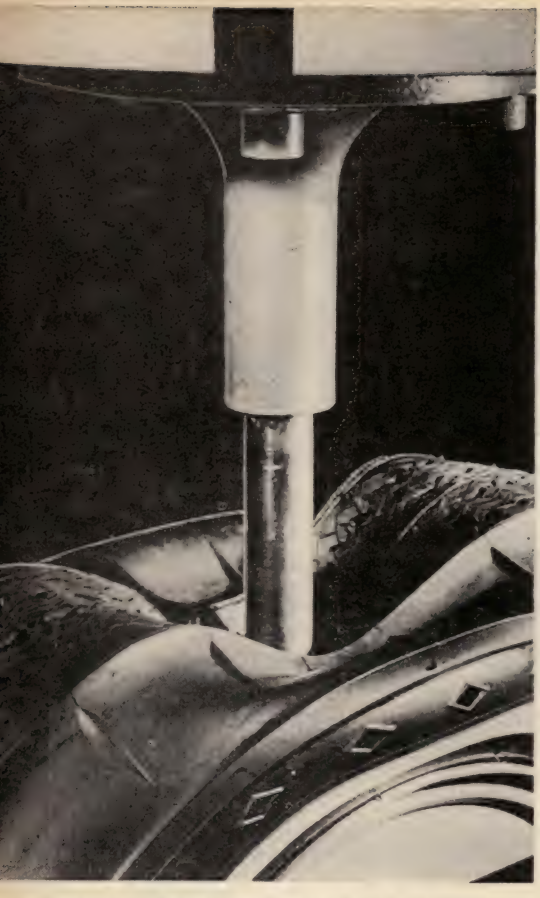
TIRE BUYING has always been a tricky business. One tire sells for $8.88, another for $48.88. What does the extra cash buy, and how much of it? Whatever it is, is it worth the price to you?

The new safety standards (see p. 132) make the job a little easier. Now you know that a reasonable amount of safety is built into every tire, even the cheapest. But picking the right tire for your kind of driving—and getting a dollar's worth of value for every buck you spend—is as tough as ever.

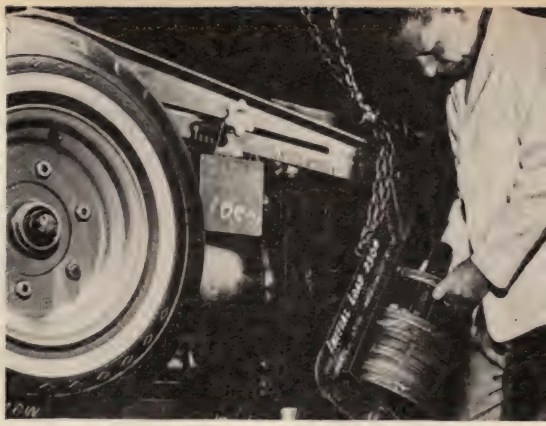
It's tough because tires—while they may look simple—are really complicated machines. And both the materials used (the rubbers, the additives, the fabric) and the design (the way they're put together) affect the performance and value you get from your car's new shoes. Without knowing something about what goes into them—and why—it's impossible to know what you'll get out of them.

First, the materials: The chief tire ingredient is rubber, accounting for more than half the tire by weight. No single rubber is ideal from every standpoint—traction, wear, aging, ride, price—so most tires contain a blend, each rubber with its own advantages and disadvantages.

Natural rubber was the principal ingredient for years. Today it's been largely replaced by synthetics like SBR—styrene butadiene rubber—the first artificial rub-



PLUNGER RAMS INTO TREAD AREA of inflated tires. This is part of the test procedure Akron has agreed on to help their tires meet basic safety demands



WEIGHTS ADDED TO ARM of tire test machine prepare the shoe for running with a given test load, at a known speed, for a given time in one of new tests

BREAK STRENGTH Rayon vs. Nylon			
	Second Line (Nylon)	First Line (Rayon)	Premium (Nylon)
Tire A	2517	2661	3124
Tire B	2345	1654	2551
Tire C	2870	2133	3019
Tire D	2749	2707	2996
Tire E	2714	2204	2829

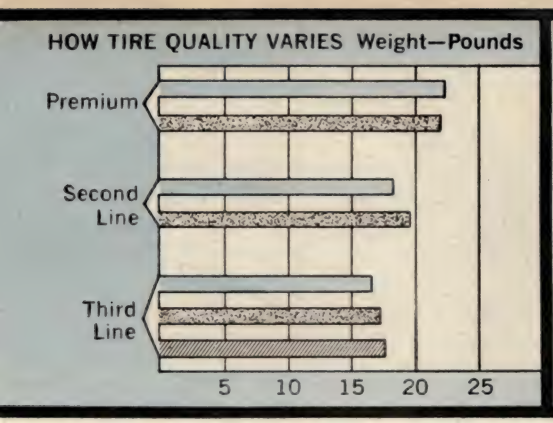
USUALLY, BUT NOT INVARIABLY, nylon-cord tires have higher break strengths than those with rayon cord. Tires listed are from the Big Five manufacturers

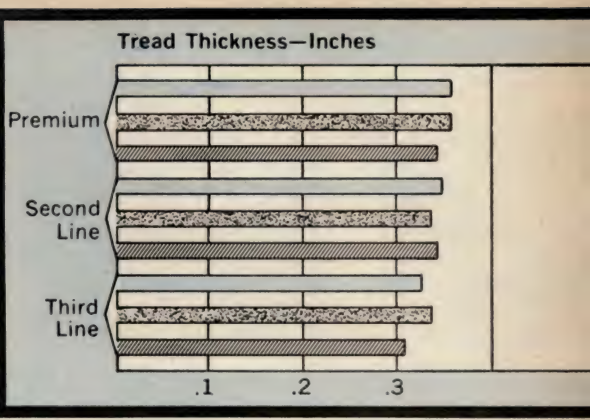
ber to get wide use. Newer rubbers have certain improved characteristics, however. Polybutadiene, for example (Firestone's), gives both fine tread wear and a reasonably soft ride, but dump too much in the mix and traction and skid resistance drop sharply; 40 percent is the maximum you can use today, though experts hope to find ways to increase this and improve tread wear even more. Karl Brandau, Firestone rubber expert, estimates polybutadiene has boosted tread life alone by 20 per cent. (Each company, incidentally, has its own name for its polybutadiene compound. Firestone uses Sup-R-Tuf, for example; Goodyear, Tufsyn, Goodrich, SuperSyn.)

Synthetically Natural?

Another synthetic, called polisoprene (Goodyear calls it Natsyn), is the closest thing to natural rubber from a test tube. But it has better tread wear, more resilience, and improved heat durability over the natural product. Still another is Firestone's Duradene—chemists call it a stereo copolymer of styrene and butadiene—with fine wear, cool running and good wet-traction characteristics. It was used on A. J. Foyt's '64 Indianapolis winner. For the first time, a set of tires went the distance with rubber to spare.

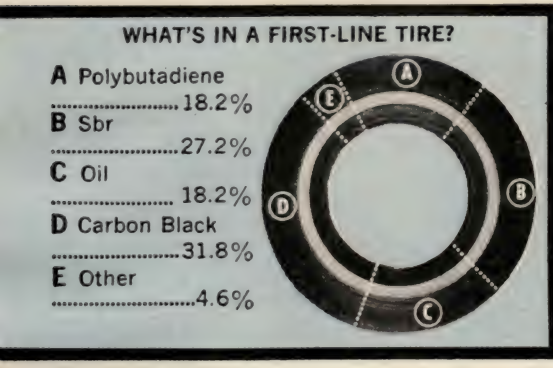
A day-after-tomorrow tire material is polyurethane. You may remember Goodyear's demonstrations a few years ago with the lit-up transparent tires. Neothane —Goodyear's name for it—is so tough that tires made from it don't even need cords. They can be molded like plastic buttons. But Neothane won't be in tire stores soon. Its biggest trouble is a weird one: It grows. The tire keeps stretching until the tire is too big for the wheel well, and may even

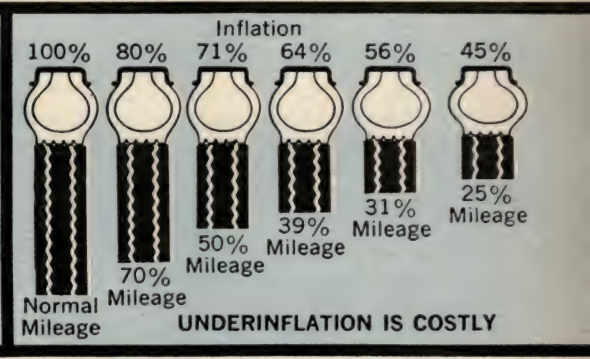




TIRES' WEIGHT CAN BE correlated in many cases with results that indicate their quality. In each chart, tires shown as "A" are from the same manufacturer

TREAD DEPTH FROM ONE manufacturer may be ahead in one line of tires, behind a competitor in others. Premiums correspond to first-line tires with nylon





PROPORTIONS VARY FROM ONE tire builder to the next, but a typical rubber compound is shown here. Special rubbers like polysoprene may also be included

UNDERINFLATION SLASHES tire mileage. If yours need 26 pounds and are only 80 percent inflated (under 21 pounds) you're losing a third of the tire life

rub the fender on turns. A fabric carcass would hold it to size, but Neothane won't stick to present cords.

In addition to juggling rubber types, tire companies mix in additives like carbon black for abrasion resistance. The finer the particles, the better the tire wears. But also, the more it heats up in use. Engineers have to strike a compromise to get both good abrasion resistance and reasonable heat characteristics.

Generally, low-priced tires are made largely of lower-cost synthetics, such as SBR. For years, tire companies also held rubber costs down in low-priced lines by mixing in some reclaimed rubber. Now the trend is toward stretching the mix with oil instead. It reduces price as much as reclaim without lowering wear resistance, yet also improves ride and squeal resistance. More expensive tires have more of the special materials that give longer tread wear and other better performance characteristics.

As important as the rubber in a tire is the fabric. The cord carcass gives the tire its strength and basic shape. Rayon and nylon are, of course, used in almost all tires today. For new cars, Detroit insists on rayon (such as Tyrex). But car owners, usually buy nylon replacement tires.

Nylon Versus Rayon

Car makers like rayon because it gives a quiet, velvety ride and shows off a new car to its best advantage. It also gives slightly better tread wear than nylon. "Nylon has a lower modulus; it's stretchier," says Dr. Edward T. Lessig of B. F. Goodrich's tire fabrics division. "This stretchiness lets the rubber scrub the road more and causes a little more wear, every-

RADIAL TIRES' MAIN CORDS RUN direct from bead to bead. Magnifying glasses compare truck radial cord (left) with those on bias-ply tire. Left comparison photo shows the multiple belt required for radials' tread stability

thing else being equal. It can vary, but rayon might give as much as 10 percent more tread wear."

Nylon's biggest sin, in the eyes of automotive engineers, is flat-spotting. After a car has been parked for a few hours, the side of the tire touching the ground becomes temporarily deformed. When the car starts, the flat spot thumps every time the wheel goes around. A few miles of driving, and the thumping disappears.

Replacement tire buyers, apparently, aren't bothered by the thump and aren't impressed by rayon's virtues. They're convinced that nylon is stronger, and thus a better buy. They're right about the strength. While either fabric is adequate for normal driving, nylon shoes are usually stronger than comparable rayons of the same blend (Fig. 1). And even if break strength were identical, nylon would still have an edge. "Since nylon is stretchy," says Dr. Lessig, "it can spread an impact shock wave out better than rayon. It's like catching a baseball; your hand gives to take up the shock. Nylon does the same thing."

B. M. Wolf, a Firestone textile expert, says, "Truckers are split. In operations that emphasize tread wear, they'll buy nothing but Tyrex rayon. But if they're worried about body and heat failures, they swear by nylon." Thus nylon is used in virtually all off-the-road and airplane tires, intercity busses, and race cars.

Nylon makers tried hard to get car makers to put nylon tires on new cars by designing a non-flat-spotting nylon called N-44. "It started out with a big bang," says Wolf, "but the bang has sort of fizzled. When N-44 is at its best, it is almost immune to flat spotting. Trouble is, it's not always at its best. When the moisture content rises slightly, it drops back almost to

TWO-PLY TIRES USE bigger, stronger cord for similar total strengths as old four-plys. In demonstration photo (right), new cord carries total car weight

CLEAR, ATTENTION-GETTING polyurethane tires were lighted from inside for promotion shots like this. Material, so tough it needs no cord of any kind, hasn't made the grade. Tires grow until they're too big for the wheel wells

the level of regular nylon."

While nylon and rayon battle for the tire market, other new cord materials are beginning to appear. Most promising is polyester, sold under trade names like Vytacord and Dacron. "This new material," says Goodyear's fabrics development manager, T. M. Kersker, "has the strength and durability of nylon with the smooth, easy ride of rayon." One polyester tire—Goodyear's premium-priced Double Eagle—is now on the market. Further use is held up primarily by high price.

Problems with Glass Cords

Meanwhile, at least one really far-out fabric—glass—is catching Akron's attention. Tire makers like it because, weight-for-weight, it's three times as strong as steel. But it also has problems.

"Glass is its own worst enemy," explains Goodrich's Dr. Lessig. "The fibers abrade each other and break." Individual coating helps, but there is still another problem. While glass is extremely strong in tension, it is weak in compression. And in ordinary tires, the sidewalls go through both tension and compression. But radial-ply tires, whose cords stay under tension and don't compress, can use glass cords.

As important as the quality of materials used in a tire is the quantity. Generally a more expensive tire not only has better materials, but more of them. Tread rubber is thicker for increased mileage, and extra cord gives greater carcass strength for better impact resistance and blowout protection (see charts).

More expensive tires tend to be heavier, but tire building isn't a simple matter of the-more-the-better. Extra thickness, for example, may increase tread life, but it may also contribute to excessive heat

(Please turn to page 230)

TUNGSTEN-CARBIDE FOR ICE AND SNOW CONTROL

SNOW TIRES have been popular for years, but what do you do on ice where their bite is pretty anemic?

Some tire makers and recappers now mold holes in the tread so dealers can add tungsten-carbide studs to order—at about a dime apiece. They're sold complete, too.

In tests of conventional summer tires vs. studded tires, the summer tires pulled with 446 and 483 pounds of force before spinning. Tires with studs—from 36 to 108 per tire—reached 598 to 666 pounds on the average. Stopping distances, too, improved by about 50 percent with studs. Control felt excellent on the frozen surface of a New Hampshire lake. (Ice racers swear by the studs.)

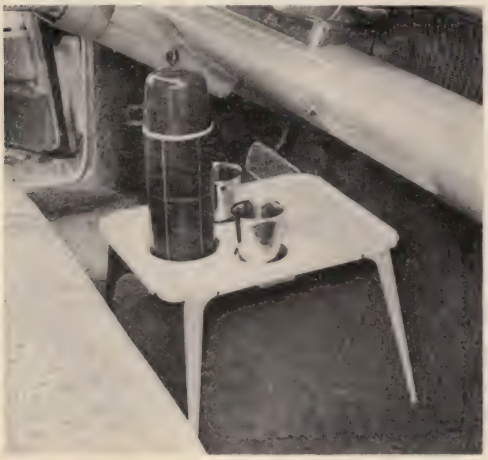
But some state laws against steel-lugged tractors on public roads may prohibit studs, too. If they stick out more than a 32nd of an inch or so, PM found that hard stops can flip studs from their sockets. With studs normally installed, a 4000-mile cab fleet test showed that some tires lost about 20 percent of their studs. Others lost none. Some tests suggest that, on dry pavement, too many studs can reduce side-slip resistance; a PM editor reported his car felt as if it wanted to "skate" on dry concrete.

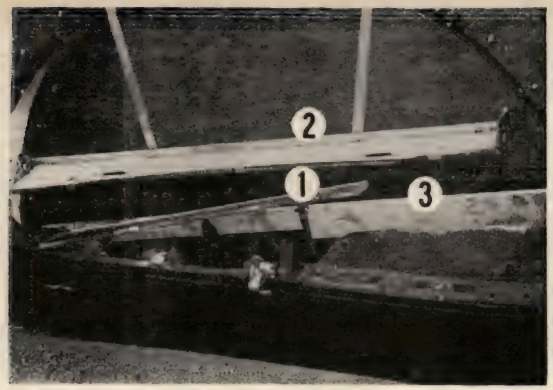
Picnic Table for Car

Straddling the driveshaft housing, a snack table holds food and beverages for front-seat occupants of a car. The table folds for storage when not in use. It sells for $3.95 from Hamill & Assoc., P.O. Box 508, Treichlers, Pa.

Missile Shuttle

Automatic and shockless transfer of delicately instrumented missiles and special weapons can now be done from ship to ship while under way. The equipment features spring-tension devices on king posts which compensate for pitch and roll.





Wide-Screen Rear View

A piggyback rear-view mirror that sweeps 160 degrees and eliminates blind spots was built into the removable roof of a Mercedes 190SL by Karl Smith of Auberry, Calif. The front of the turret is black metal; the window is plexiglass. Inside are three mirrors (numbered at left in the upturned housing). The driver looks into No. 1, which reflects No. 2, which, in turn, reflects the scene in No. 3).

It's those freeways in southern California with their many lanes of traffic that gave Smith the idea.

Tilting Floats

Adjustable pontoons now let choppers and other VTOLs land in rough seas.

The pontoons tilt from a horizontal position, for landing on hard surfaces, to a vertical position. The tilted pontoons give the craft more stability than if they were left in the normal horizontal position. For takeoff, the maneuver is reversed.

Developed jointly by the U.S. Navy's Bureau of Naval Weapons and the Gyrodyne Company of America, St. James, Long Island, N.Y., the pontoons could be adapted to any vertical-take-off aircraft.

150-MPH Sports Tourer Has American V8

When Italians and Texans get together to build a car, the results are bound to be sleek and big. The steel body and tubular frame of the Vetta Ventura are made and assembled in Turin, then shipped to Vanguard Motors in Dallas, where a 300-cu.-in., 250-hp. Buick V8 is dropped in.

The 2470-pound car reaches 60 in 6.8 seconds, it's claimed. Front disc brakes are standard. Base price is $7000, with automatic shift, sunroof, racing wheels and air conditioning extra.

Frigid Fun for Skin

BURSTING to the surface after a swim beneath the ice, a winter diver comes up for a rest. Another diver is waiting to take the rope and make his dive

USING ICE CHISELS, the divers chop a large rectangular hole in the ice. This is actually an easy job and even with thick ice it takes only a short time

Divers

It's risky, and there's no good reason for it—but some people just have to behave like seals

ALTHOUGH EASY TO CHOP, the block of ice would be difficult to remove. To solve this the divers push it down and slide it under the ice

By Gene Parker

A STINGING JANUARY WIND whipped across the frozen expanse of New York's Sacandoga Reservoir. Flinging granules of crusted snow like shot, the wind buffeted a group of ice fishermen who huddled over their stoves for protection and warmth. The temperature stood at 10 degrees.

Lifting their heads, eyes peering from muffled faces, the fishermen watched our group approach. They made no sign of welcome, but merely stared suspiciously as we passed within 20 yards.

A short distance from the fishermen we put down our scuba gear, etched a six-by-four-foot rectangle on the ice, and took up our long-handled ice chisels to chop the hole. When it was cut and the large floating chunk pushed under the ice, two of us slipped into our breathing equipment.

One of the fishermen stood when our intention become apparent. He took a few steps toward us, then stopped and just watched in disbelief. I buckled on my weight belt, then I took the end of a 100-foot line, looped my waist and knotted it with a bowline. The other end was tied to a short ice chisel driven into the ice. I spit into my face mask and rubbed the spittle around to keep it from fogging underwater, then I put it on. I slipped the mouthpiece into position and took several breaths for assurance that the regulator was functioning. Then, when my partner was ready, I jumped into the water. I could almost hear the fisherman gasp.

He should have known that it is actually warmer in the water. It can't go below 32 degrees or it would freeze solid.

Diving down, I veered to the right and swam down and away from the hole. I was bathed in the light that penetrated the thickness of ice. Looking up, the surface of the ice was like a luminescent white ceiling. Air from my regulator bubbled up and clung to the frozen ceiling like puddles of quicksilver.

Water seeped into my wet suit until there was a thin layer between my skin and the suit, a form-fitting casing of quarter-inch foam neoprene that's made

up of several pieces. There are the pants that fit to the ankles, a long-sleeved jacket that zips up the front. There is also a hood, booties and mittens. I use pants that extend to the armpits, giving me a double layer of neoprene over the vital organs which need more warmth than the limbs. The layer of water is quickly warmed by my body heat and I am completely insulated against the cold. It is as comfortable as diving in the summer.

I made a circuit around the fishing holes. The fishermen obviously weren't having much luck. There were no fish to be seen, and if there had been any in the area they would have been around to see what I was up to, satisfying a curiosity that—as skin divers know—is common to all fish. I signalled my tender with three tugs on the rope, and he pulled me to the hole.

"Tell them they're wasting their time," I said. "No fish in this area."

"They won't believe you," the rope tender said. "They're fishermen."

I laughed, then I adjusted the mouthpiece and dived again, the tender playing out the quarter-inch manila rope, keeping it just taut enough to give me leeway and also feel the tug of his signals. The tender has your life in his hands, and he must be alert to the possibilities of danger.

The wet suit eliminates the danger of freezing, but there are other hazards to ice diving that reserve it for the most experienced scuba divers. Claustrophobia is a hazard unique to ice diving, and it is terrifying to contemplate a diver losing contact and breathing the last of his air as he searches frantically for the exit. A frozen regulator could panic a diver who has never been under the ice.

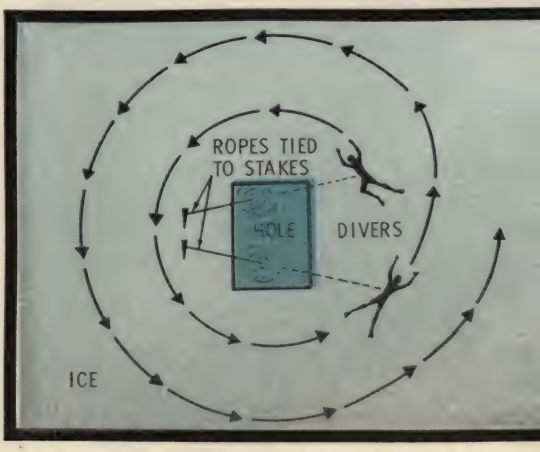
Diving in pairs is a safety measure. If one diver should lose his rope he is instructed to stay in one place a few feet under the ice. His partner then swims out with additional rope and makes a long sweep of the area until he picks him up. And as an added precaution every ice diver should wear a compass and take good bearings before he goes down.

My time was up, so I signalled the tender and he pulled me in. When I climbed onto the ice several of the fishermen were standing around the hole. One of them dipped a hand into the water and pulled it out quickly. He took a hard look at me, then he turned and stomped off, muttering:

"Nuts, that's all. The place is crawling with nuts!" ★★★

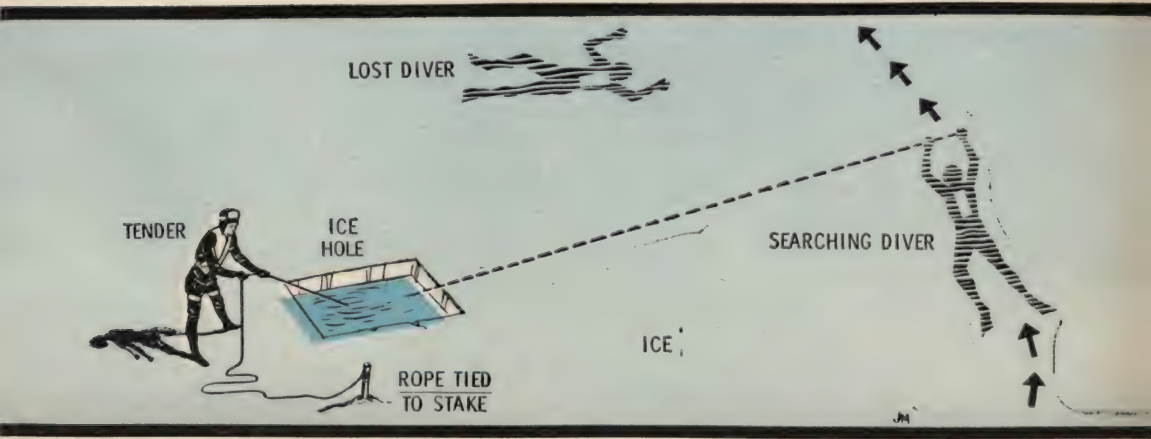
TAKING THE PLUNGE, a winter diver leaps into the water. It is never below 32 degrees, and a layer of water under the wet suit acts as an insulation

SAFETY MEASURE when first entering water is for both divers to make a small complete circle of the hole, gradually branching out to limit of the rope



FROM BELOW, the ceiling of ice is luminescent, the light pouring through from above to illuminate the water with an eerie radiance. The diver in this photo is looking up at the shadow of another diver standing on the ice

IN AN EMERGENCY when a diver has lost his rope and cannot get back to the hole, he stays in one place a few feet from the ice, and his partner swims in a wide circle with his rope stretched taut until he makes contact



RECOIL from .223-cal. cartridge fired by Stoner 63, an interchangeable small-arms system, is so slight that in this U.S. Marine demonstration the carbine is fired at full automatic with the butt held against the mouth

New Weapons for...
HOT LITTLE WARS

Treetop heliports, throw-away flame throwers, trucks that spew shrapnel like rolling Roman candles, dart-throwing hand grenades—they're all part of our new arsenal for fracas warfare

By Harold E. Jerome

A FLIGHT OF HELICOPTERS loaded with crack Special Forces troops hovers over a dense jungle area concealing hostile guerrilla forces.

The whirlybirds nestle down near their quarry, right on the treetops, landing on little heliports of aluminum matting suspended in the foliage on nylon nets.

The troops and their gear descend rapidly to the jungle floor 60 feet below by brake-equipped lines that regulate the speed of the descent.

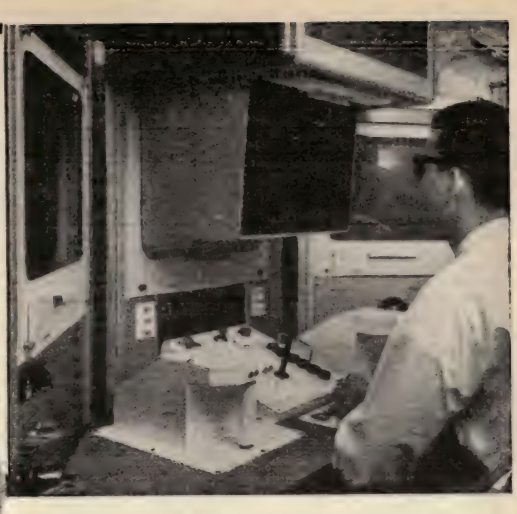
Some are armed with light shoulder-fired weapons that can spit out *flechettes* ("little arrows") against a point target, or grenades against an area target.

Others carry a pistol-type weapon that fires a tiny rocket projectile, large quantities of which can be carried by the individual soldier.

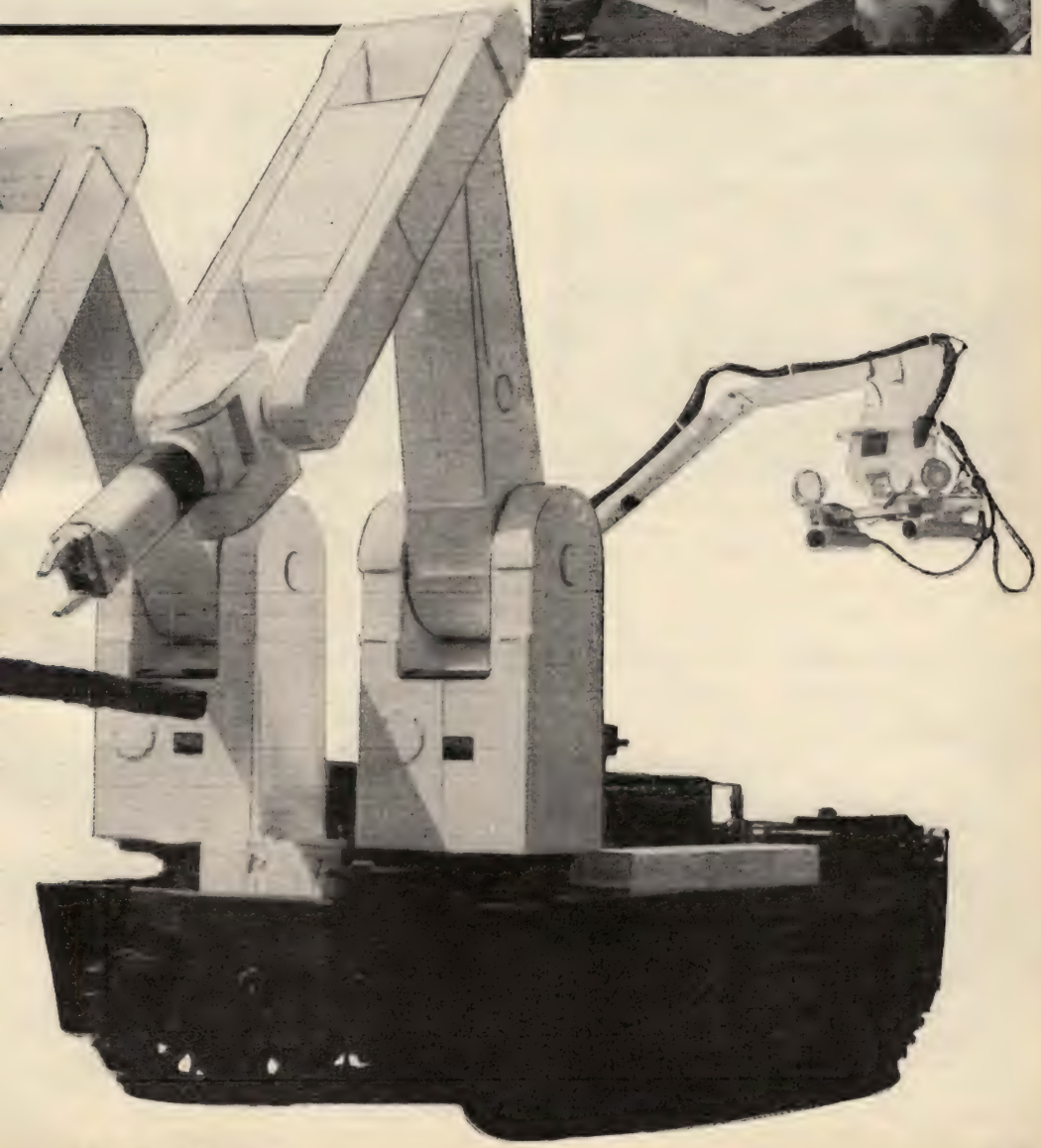
For attack against dug-in positions and armored vehicles, a few troopers carry light, one-shot "throw-away" flame throwers, with ranges up to 75 feet.

As the force starts to thread its way through the jungle,

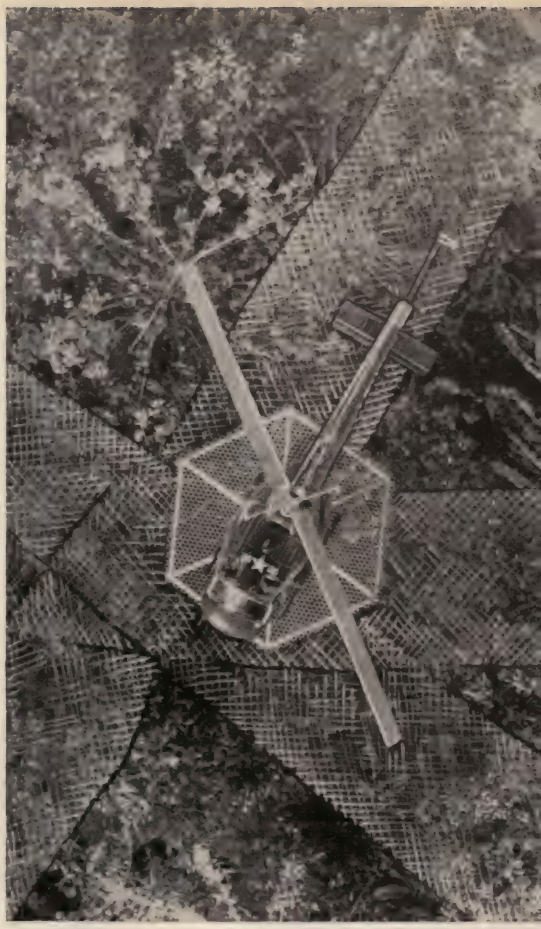
OPERATOR of a robot monster sits in a van miles away and directs its activities with an electronic console. A pair of TV "eyes" in the robot transmit pictures of the terrain to the monitoring screens in the moveable control center



CAPABLE of traveling at 40 m.p.h. over any terrain a tank can traverse, this robot can lift 600 pounds. It can destroy enemy weapons and equipment, and it can operate a variety of power tools for constructive work under fire



INTENSIFYING the light from moon and stars, a night sight allows soldiers to sight a weapon (top) or view a battlefield (bottom) despite total darkness



SPREAD over a treetop like a canopy, this metal platform is being tested as a makeshift landing pad for a helicopter in the most dense jungle cover

numerous ambush detection devices and techniques come into play. Some of these involve ingenious uses of chemical and electronic principles. Others are even more exotic. The jungle fighters also release specially trained birds that will fly ahead of the column and give warning of ambush.

In terrain more suited for motor transport, the force rides in trucks armed against ambush with rows of shrapnel-firing devices on each side of the vehicle, like ancient men-o'-war belching grapeshot from their gun-ports.

All of this is a fanciful scenario, of course. None of the equipment mentioned —except the helicopters—are ready for issue by the supply sergeant.

But every item is at this moment somewhere in the research and development cycle—some little more than a gleam in a researcher's eye, others actually in the field-testing stage before being turned over to troops.

While the new emphasis given to guerrilla and counter-guerrilla warfare by the U.S. in the past three years—the so-called "lower end" of the warfare spectrum—has not gone unnoticed by any means, few people realize the amount of effort actually going into the development of this type of equipment today, overshadowed as it is by missiles, spacecraft, nuclear ships and supersonic aircraft.

But some idea can be gained from the fact that, for the 12 months ending in June, 1965, the Pentagon plans to spend more than $103,000,000 with all military services and agencies for the development of counterinsurgency weapons and

FIRED LIKE A MISSILE, the deadly Redeye missile is attracted by intense heat. When it is aimed and fired at a jet plane, it picks up the plane's exhaust pipe and heads straight for it, exploding a warhead upon contact

DESIGNED FOR GUERRILLA WARFARE, this two-man boat is primarily used as a load carrying device. The two sides fold together like a suitcase. It is waterproof and can be carried or skidded across the terrain by two men

equipment, ranging from air-launched strafing rockets to collapsible canteens. This compares with less than $10,000,000 in 1960 for the same categories.

Uncle Sam, in short, intends to be ready for the "dirty little war" type of conflict wherever the Communists challenge this nation's vital interests. Usually, this means helping a technically backward country fight off subversion supported from outside, as in South Vietnam. That country, in fact, has become a laboratory for developing counterinsurgency equipment and techniques.

The wave-upon-wave mass attacks of the Red Chinese during the Korean War made a long-lasting impression on U.S. Army thinking, and influenced subsequent weapons concepts significantly. Perhaps the single most comparable influence arising out of the Vietnam conflict is that of the enemy ambush. And in at least one instance, a weapon devised to meet the mass attacks of the Korean War is being modified for application to the vehicle ambush situation in counterinsurgency fighting.

To meet the thorny problem of the vehicle ambush, the Army first considered mounting a series of 48 sawed-off shotguns on the sides of the trucks in Vietnam. These would fire salvos of No. 4 magnum buckshot if the truck ran into an ambush, but this idea was abandoned. Among other things, the shotguns generated too much heat.

Then they thought of mounting Claymore mines on the trucks. The Claymore is a deadly little device that sits on a tri-

(Please turn to page 204)

The Gun That Does Everything

The Stoner 63 Small Arms Weapons System features six different guns fabricated from one basic component group, with a variety of parts that are 85-percent interchangeable.

Designed by Eugene Stoner, inventor of the AR-15, and produced by Cadillac Gage Co., this new system is chambered for the .223-caliber cartridge. With the exception of the barrels, the components are of steel stampings and can be produced in any machine shop without special tooling.

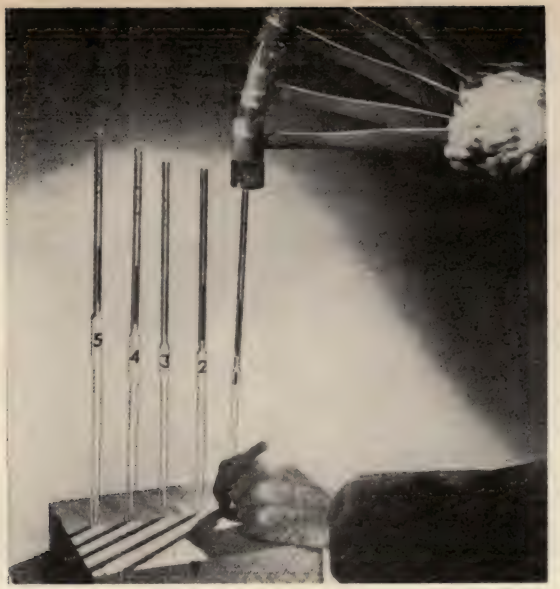
Any of the six weapons can be repaired or converted to another weapon in minutes in the field, using only a cartridge as a tool. The weapons are lightweight and are accurate and lethal up to 400 yards.

ONE COMMON RECEIVER and firing mechanism accommodates interchangeable parts for six weapons. A unique feature is that one barrel is removed by pressing a button and a new one slipped into place

EACH WEAPON is capable of firing a rifle grenade when a blank cartridge is inserted into the breech. Although it would be unusual for a machine gun to fire a grenade (above) it could be used in emergency

FIRING AT FULL AUTOMATIC, a feature of every weapon in the Stoner 63 system, the .223-caliber bullet disintegrates on contact, creating a small explosion that will chop a concrete block wall to pieces

THE CARBINE has a folding stock which makes it only 26 inches long. It can be strapped to the side for parachuting, and with its minimum recoil and the pistol grip, it can also be used as a machine pistol



Tough as Nails

If you run out of nails, you might try pipets—if they're made of Corex glass. These new laboratory pipets can be driven into wood, as shown, without being damaged. They also have greater resistance to scratching and to the corrosive action of fluids than do standard pipets.

Their secret lies in a special process that chemically strengthens them, explains the maker, Corning Glass.

Bedtime Picture Stories

Put a record on the turntable, the pick-up arm on the record, and the film strip into its slot. Turn on the switch, and you've got full-color pictures on the screen in time to music and words.

Show 'n Tell can be operated by its youthful viewers. Picturesound programs to play on the General Electric phono-viewer are 99 cents each, while the viewer itself costs $29.95.

One-Man Rescue Submarine

One man operates this undersea rescue submarine being developed by General Dynamics Boating Division. It is specifically designed to locate and rescue men from sunken submarines, but it can also be used for marine research work.

Springy Seesaw

Four steel arms mounted on noncompressing springs make the Buck-A-Bout an exciting (and safe) four-passenger seesaw. Made by Game-Time, Inc. of Litchfield, Mich., this piece of playground equipment is priced from $229 to $378.

Remote

Wind Indicator

By Walter Gustafson

IF YOU'RE a weather enthusiast, here's the perfect accessory for your barometer and indoor/outdoor thermometer. It enables you to check the current wind direction at a glance, without leaving your living-room chair.

Basically, the indicator is a two-part assembly consisting of a vane on the roof which transmits wind direction through a stator-rotor assembly in the attic to a panel that can be mounted in any room. The low voltage used presents no electrical hazards, and the entire assembly can be put together in a few evenings from parts readily available at a plumbing shop or hardware store.

Begin construction with the upper unit The rotating shaft which supports the vane should be made from a piece of ⅜-in. rigid copper tubing, sometimes described as pipe. With this type of tubing, the nominal diameter and inside diameter are approximately the same.

The inner shaft is supported by two ball-bearing units, each having an outside diameter of 1⅛ in. and an inside diameter of ½ in. The first bearing is positioned on the ⅜-in. pipe at a point about 12 in. from the end of the pipe. Then two short sleeves cut from a standard ⅜-in. copper coupling are slipped over the pipe and soldered in place, one sleeve on each side of the bearing. Be sure each sleeve is snug up to the bearing. These sleeves lock the bearing in place on the shaft so that it cannot move up or down.

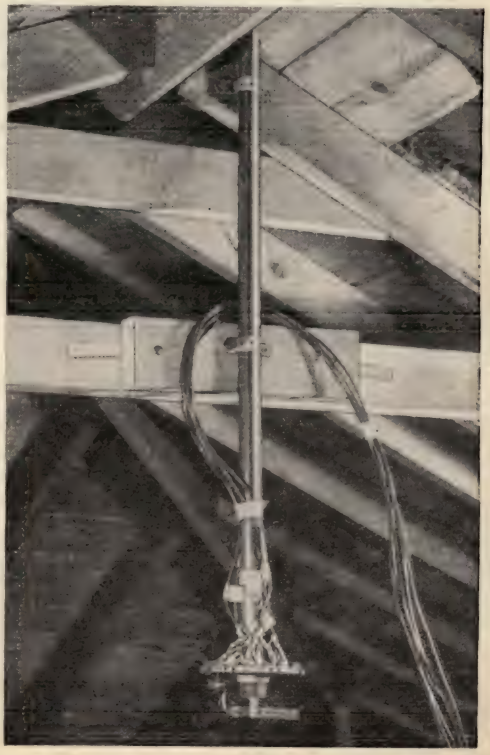
The long end of this pipe should now be passed through the larger pipe so that the bearing butts against the end of the 1-in. pipe. Secure the bearing in this position by sliding a 1 x ¾-in. reducer-coupling over the small pipe, over the bearing (the bearing will go inside the large end of the reducer-coupling) and on the pipe as far as it will go. Solder the coupling in this position.

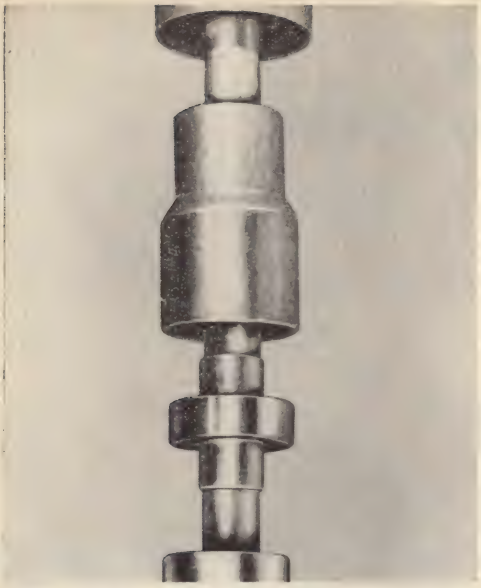
As this is the end that will be on the roof, it's necessary to prevent snow and rain from entering the open end of the pipe. This can be accomplished with a combination of reducer couplings. To make this assembly, proceed as follows.

Start with a 1¼ x ¾-in. reducer-coupling. Cut a piece of ¾-in. pipe about 1½ in. long and solder this in the small end of the reducer. Now, solder a ¾ x ⅜-in. reducer-coupling to the ¾-in. pipe

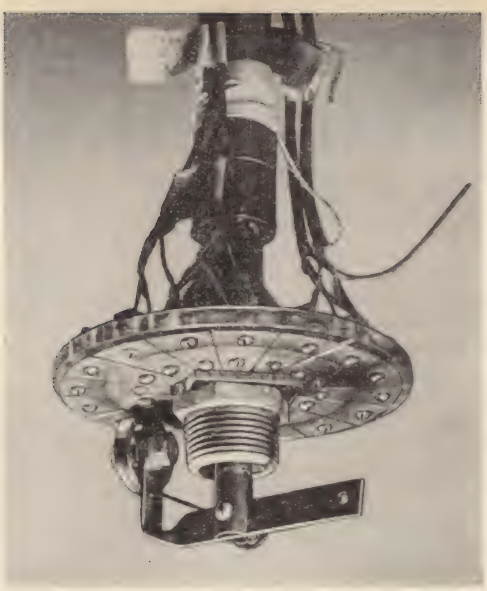
ON THE ROOF, an attractive silhouette wind vane swings into the wind, pivoting easily on the ball bearings located inside the weather-proof sleeve

IN THE ATTIC, a sensitive stator-rotor assembly attached to the bottom of the mast relays the wind direction to an indicator panel in your living room





PROTECTIVE CAP holding the upper ball bearing is made by assembling three copper reducer couplings



SENSING UNIT consists of an arm mounted on bottom of mast which rotates on segmented copper disc

protruding from the larger coupling. With a round file, remove the flange from inside the ⅜-in. end of the reducer-coupling. This flange acts as a stop when a pipe is inserted. After the flange is removed, the reducer will slide readily over the ⅜-in. pipe.

Slide the reducer-coupling combination you have just made on the ⅜-in. pipe, the large end toward the 1-in. pipe and the coupling securing the bearing. Bring it down until the coupling overlaps the ¾-in. coupling by about 1 in. Finally, solder in place at the small end of the reducer.

A second bearing is now mounted on the other end of the assembly. Slide the bearing over the small pipe and secure it in position with sleeves, as you did the upper bearing. Then pass a 1-in. adapter coupling over the bearing and pipe and solder it in place. (This adapter must be of the type having one end for a sweat fitting and one end threaded.)

The stator is constructed of plexiglass and sheet copper. You will need a circular piece of plexiglass ¼ in. thick and 5 in. in diameter. Drill a 1⁵⁄₁₆-in. hole in the center of the plexiglass.

Next, on a square sheet of copper (approximately 23 ga.) inscribe a 4⅞-in. circle and divide this into eight equal pie-shaped segments. Cut a 1⅜-in. hole in the center of the sheet of copper.

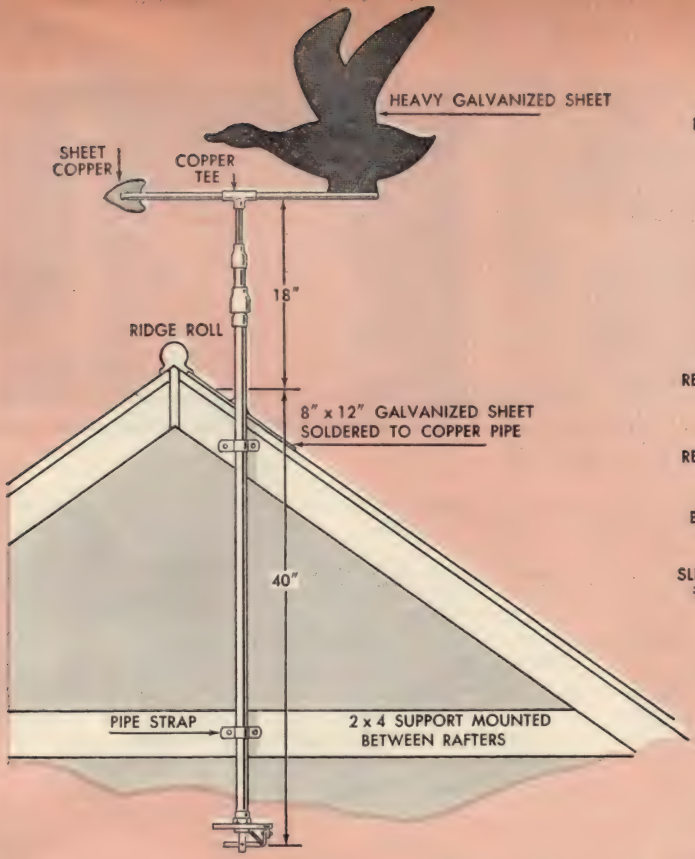
Before cutting the copper into segments, center the sheet carefully on the plexiglass and place both pieces together in a vise. Drill two ⅛-in. holes through each segment of copper and the plexiglass backing it. Keep the holes close to the outside circumference of the copper and close to the lines marking the segments. As these holes are drilled, secure the copper to the plexiglass using ⅛ x ¾-in. stove bolts.

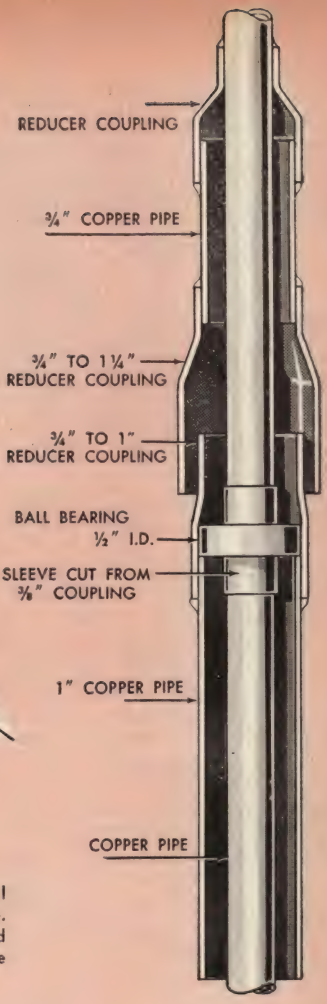
After all the holes have been drilled, number each segment of the copper and mark corresponding numbers on the back of the plexiglass so that when the segments have been cut apart they can be replaced in exactly the same position.

Remove the copper from the plexiglass, and with tin-shears, cut the disc into segments. File the sides of the segments, taking off about ¹⁄₃₂ in. from each edge. Then bolt the segments to the plexiglass according to their numbers and check to make sure that no two edges of the segments touch each other. You may have to do a little additional filing and fitting as you replace them. When completed there should be about ¹⁄₁₆ in. space between segments.

Next, place the plexiglass disc with its attached copper segments over the threaded end of the copper fitting. The copper segments should be on the "down" side, facing away from the long end of the pipes.

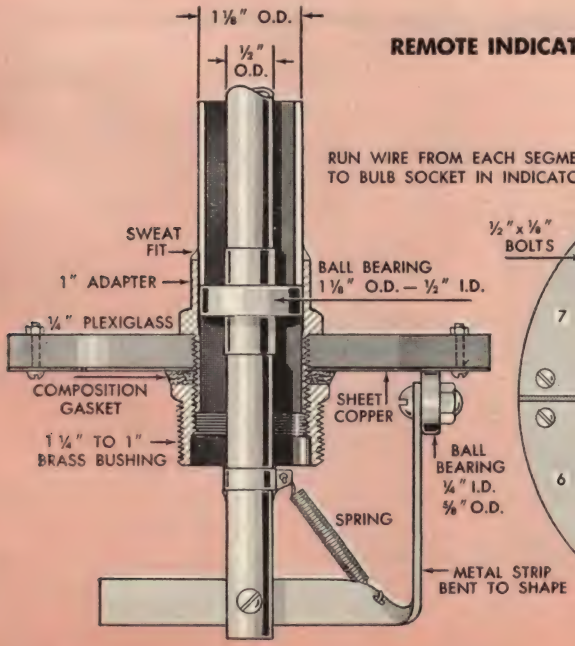
The large washer above the plexiglass serves to insulate the stator from the rest of the assembly, and also overlaps the inside circumference of the copper segments to hold them securely in place. You can buy the washer or make it. In either case it should have an outside diameter of 1⅞ in., an inside diameter of 1⁵⁄₁₆ in., thickness

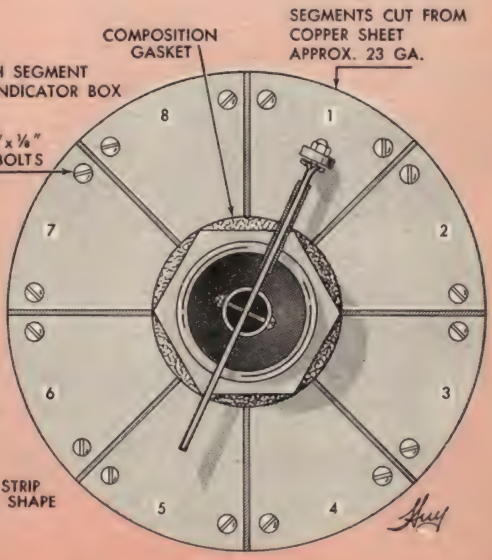


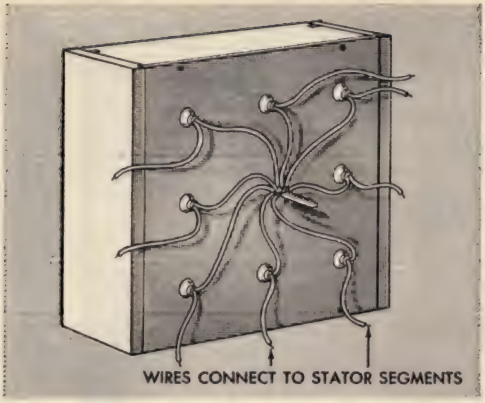


DESIGN OF VANE is purely a matter of personal taste, though the final result should offer sufficient surface to be deflected by a light breeze. After making a paper pattern of the design, cut the vane from galvanized sheet and solder it in a slot cut in the rear section of 1-in. copper pipe

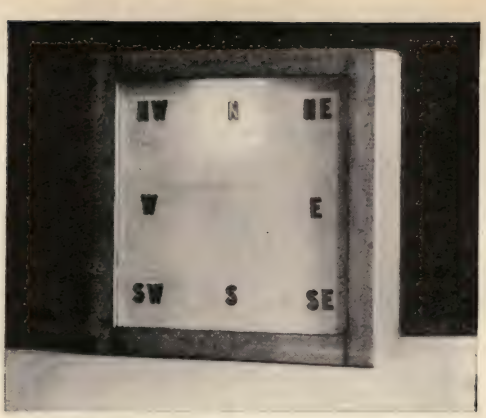
REMOTE INDICATOR







EIGHT WIRES, one from each socket, are twisted together and connected to transformer in the basement



WIRES FROM SOCKETS are connected to segments of copper disc, activating light when connection is made

of about ¼ in. and be made from hard rubber, bakelite or some other nonconductor of electricity.

Pass the washer over the threaded end of the coupling, and using a 1¼-in. x 1-in. brass bushing as a nut, draw the washer right up to the plexiglass and copper stator assembly. Don't pull it up too tight or you may crack the plexiglass. It should be just tight enough to prevent the plexiglass unit from turning.

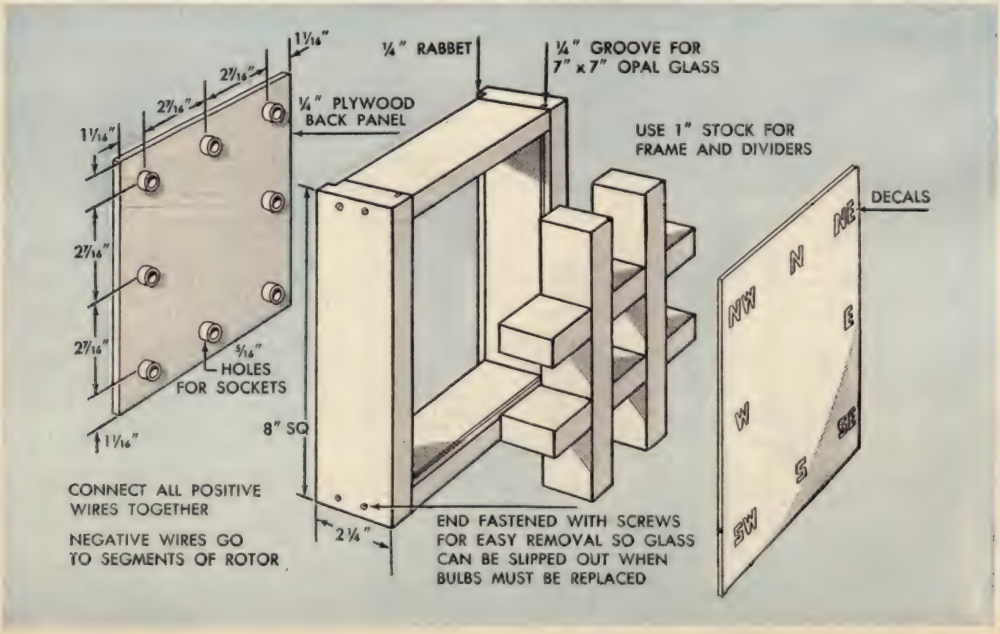
The most difficult and exacting part of the entire project is construction of the arm and rotor which will make contact with the copper segments and transmit the electrical signal down to the indicator panel in your home.

Still working on the end on which the plexiglass unit is mounted, cut off the small-diameter pipe, leaving approximately 4 in. Then, with a hacksaw, cut a 3-in. longitudinal slit in the center of this pipe. Use a file to widen this slit to ⅛ in.

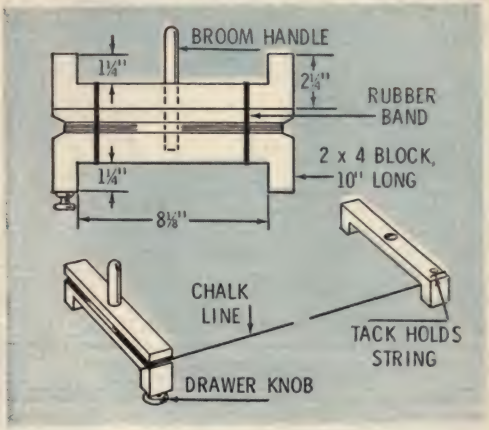
Make the rotor arm from a piece of strap iron or brass ⅛ x ⅜ in. x 8 in. Insert 3 in. of this strap in a vise, placing it so that the jaws of the vise grip the flat side of the strap. Be sure that it's exactly horizontal. Now, with a wrench or pliers, twist the free end one quarter turn. Then, without removing the piece from the vise, bend the long side toward you to make a 90-deg. bend.

Remove the arm from the vise, make a center-punch mark ¼ in. from the end

(Please turn to page 206)



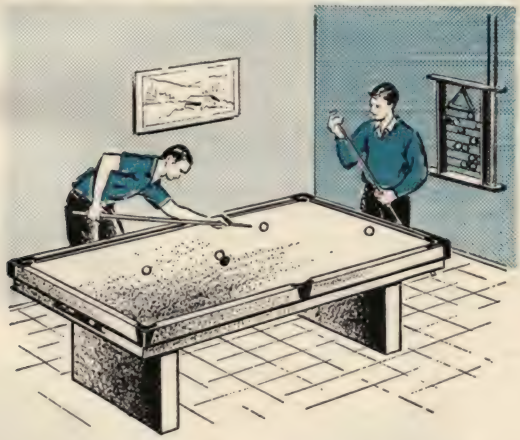
Line Holders Clamp Themselves to Blocks

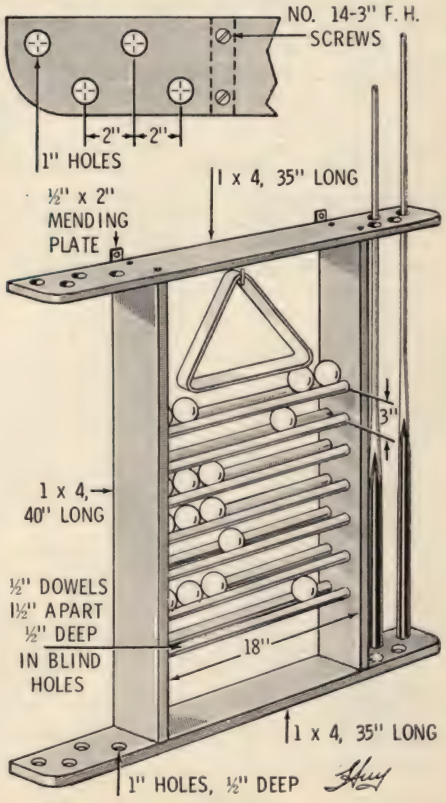


The clamping action of this combination line holder and reel results from the tension of the leveling string pulling on one end of each holder. The string, which is a standard mason's chalk line, is stored on the larger of the two holders which serves as a reel for winding in or playing out the string. Its broomstick handle permits nesting the two holders when not in use, while a drawer knob provides a crank.

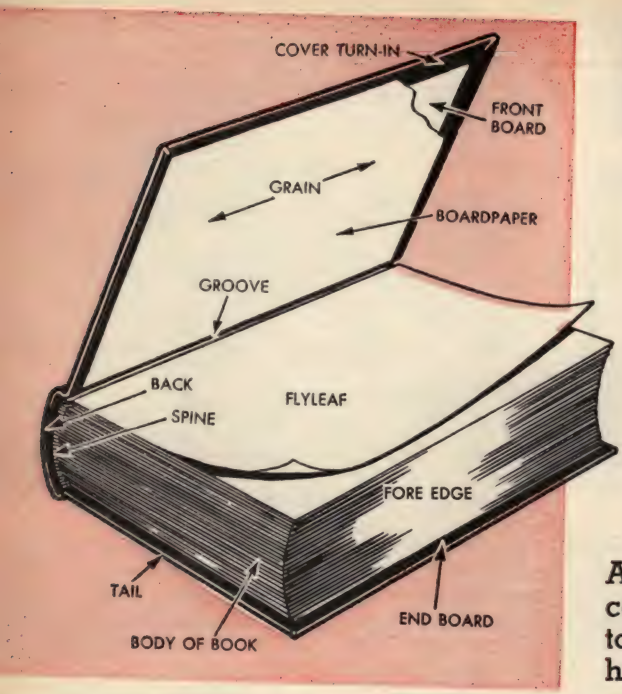
Cut the holders from lengths of 2x4. For standard 8-in. block, follow the dimensions shown in the details. For other sizes of block, make the distance between each holders' jaws ⅛ in. greater than the block thickness.—*Ralph S. Wilkes*

Hanging Wall Rack Holds Your Pool Equipment





After buying a pool table for my family room I found that we needed a place to keep the rack and cues so I built the hanging wall rack detailed at the right. As you can see, the balls are cradled on pairs of ½-in. dowels, the ball rack hangs on a hook bent from a piece of coat hanger, and the cues stand in holes bored part way through the base. The cues are inserted in the rack by passing the tips up through the upper holes first. Mending plates are used to fasten the rack to the wall by letting them extend above the top member.
—*L. Dock*



Rebinding Damaged Books

By Manly Banister

A homemade book press, a few common tools, and you'll be able to handle anything from a torn hinge to a complete rebinding

NOBODY WANTS to throw out a good book just because the binding is damaged. Chances are it's one of your favorites, for these always receive the most handling. Often, the damage can be repaired in a couple of minutes with a little glue or paste. Sometimes a complete tearing down and rebinding may be required. But in either case the investment in time and materials is negligible when balanced against the result.

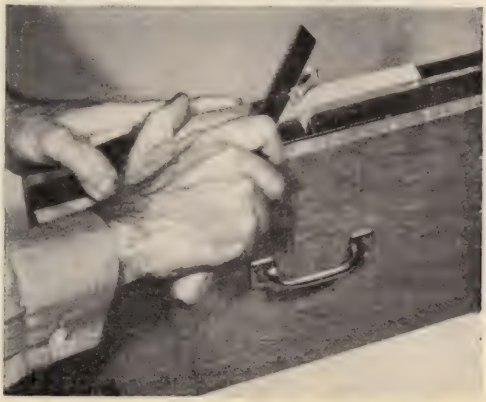
You don't need a lot of expensive equipment to repair books. The most important piece of equipment is a book press, and the easy-to-build unit detailed on the opposite page is quite satisfactory for most jobs. In addition, you'll need scissors; a ruler; a hammer or mallet; a bone "folder" (or make a wooden one by curving the ends of a flat stick and rounding the edges); a sharp knife, and a large needle.

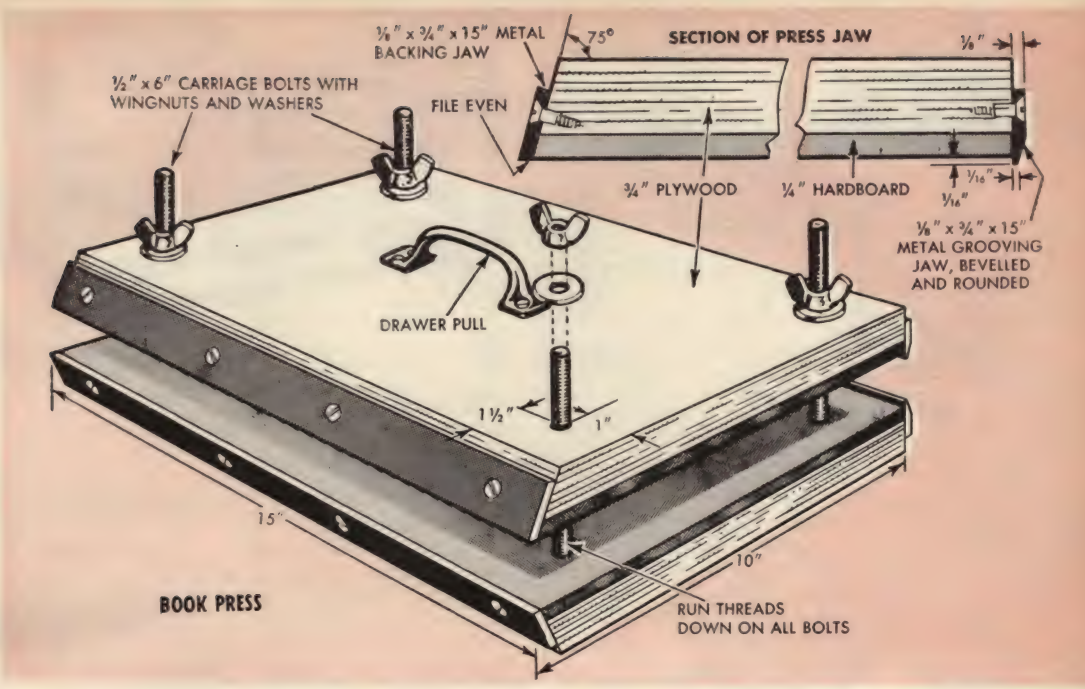
Materials used in repairing books are also inexpensive. In addition to the paper, mesh-cloth "super," cover boards and book cloth, you'll have to buy a spool of #25 linen thread, a cake of beeswax (for waxing the thread), a small can of hide glue and a jar of library paste. All of these may be obtained at a bookbinder's supply house.

One thing to keep in mind when repairing books: Paper, like wood, has a grain

1. WITH A SHARP KNIFE, cut through the hinges on both sides to free the body of the book from covers

2. CLAMP BOOK in the backing jaws of the press and scrape off all the paper backing, super and glue





running in a given direction, and every piece of paper put into a book must have its grain running vertically, from the head to the tail of the book. Otherwise, it's bound to buckle and cause trouble. One simple way of determining the direction of the grain is to fold a sample sheet and wet the crease. If it dries smooth, the grain runs parallel to the fold. If the crease buckles, you've folded the paper across the grain.

The following steps, numbered to correspond with the illustrations, cover a complete rebinding. This will probably only be necessary if the book is in very bad shape, with the sewing loose and sections coming apart. To repair less severe damage—broken cover boards, torn flyleaves, etc.—simply follow the appropriate steps.

STEP 1. Cut the body of the book free of its cover by slashing through the hinges on both sides with a *sharp* knife. Tear off the flyleaves and throw them away.

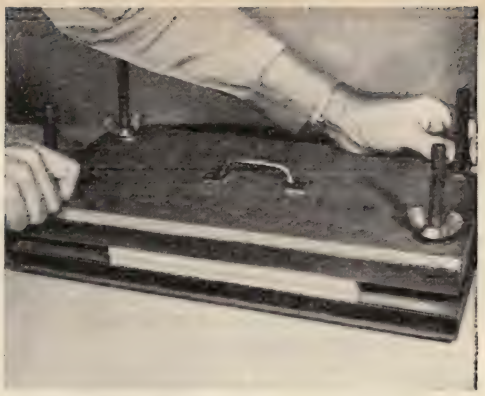
STEP 2. Clamp the book in the angled backing jaws of the press and dampen the spine. (If old glue is really hardened, spread on a layer of library paste and let it stand a while.) Scrape off the paper backing, the mesh super and the glue, down to the folds of the sections.

STEP 3. The body of the book is composed of sections called "signatures" in

3. STARTING WITH the first section, find the center and cut each stitch. Do the same to all the sections

4. SEPARATE BODY into sections and flatten the groove in each. Cover with paper to prevent damage

5. IF OUTSIDE SHEET of section is torn, repair it by pasting a ½-in. strip of bond paper over the tear



6. REASSEMBLE BODY, stacking sections fold to fore edge in alternating groups. Keep in press overnight

the trade—a series of sheets folded together, usually forming either 16 or 32 pages. Find the center of the first section, disclosing the sewing thread, and cut each stitch down the gutter. Do the same to the rest of the sections.

STEP 4. Carefully separate the sections. Note that each is creased close to the fold. This is the "groove," formed in the backing, and it must be hammered out. Protect the face of the section with a sheet of waste paper and hammer out the groove, one section at a time.

STEP 5. In separating sections, it often happens that the outside sheet of a section becomes torn. Before resewing the book, it is necessary to repair these sheets. Cut ½-in. strips of 11-lb. bond paper, or similar, as long as the page. Lay out the damaged sheet or sheets with the inside of the fold up. After applying paste to the strip, stick it over the torn fold, being careful not to stretch the paste-dampened strip. Then rub it down and put the sheet aside. When all such sheets have been repaired, gather them together with protective sheets of waxed paper between, squeeze for a few minutes in the press, and lay them aside to dry.

STEP 6. Reassemble the sections and stack them with the fold to the fore edge in alternating groups of two or three. Place a sheet of waxed paper or aluminum foil on each side and run the press wingnuts down as tight as you can. Let the sections stand under pressure overnight.

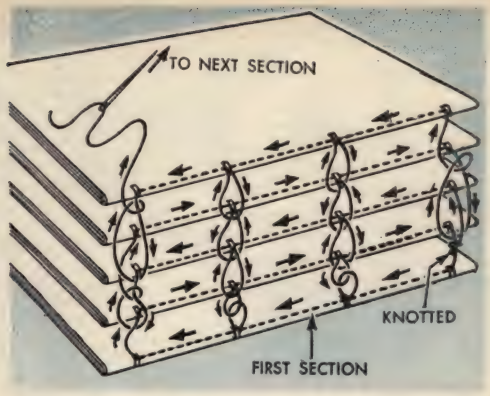
STEP 7. Take the sections out of the press and assemble them in the proper order. (Take care you don't put a section in upside down!) Clamp them in the backing jaws of the press, leaving about ¼-in. projecting. Make four or more unequally spaced marks across the back, and saw each mark with a *dull* saw about $\frac{3}{32}$ in. deep (deep enough to cut through the innermost fold of each section). The head and tail sawcuts should be placed ¾ in. from ends of spine.

STEP 8. Sewing by the lockstitch method has the advantage that no special equipment is needed. Lay the first section face down on the edge of the worktable.

9. SEWING THICKENS the spine, but pounding with a hammer or mallet willl embed threads in the folds

10. TO ATTACH new endpapers, apply a ¼-in. strip of paste down the folded edge of outside sections

7. USE A DULL SAW to make four unequally spaced cuts about 3/32 in. deep in spine of collected sections



8. SEW SECTIONS together using the lockstitch shown above. This is described in detail in the article

Thread the needle with a couple of feet of thread. Pass the needle into the tail saw cut at the head. Draw loops of thread out through the other sawcuts with a crochet hook or poke them out from inside with the eye end of the needle. Lay on the second section, pass needle in through sawcut at head and out through next sawcut down the back. Pass needle upward through the loop protruding from the section below and back into the same sawcut. Draw the loop firm (but not too tight) to form the lockstitch. Finish sewing section one to section two and tie the two threads together at the tail sawcut with a square knot.

Section three and all following are sewed in the same manner, except that there are no loops protruding. Pass the needle behind the stitch in the next lower section, then back into the section, out at the next saw cut, and so on.

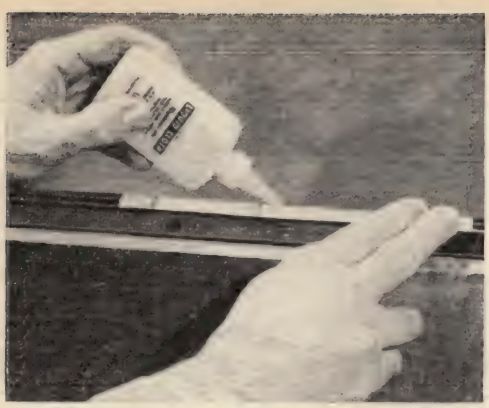
At the end of each section, the section is anchored to the one below by means of the "kettle stitch." Pass the needle behind the thread below, then bring it around and up through the loop of thread thus formed and draw it snug. When you come to the end of the thread, tie on another length so that the knot ends up inside a section. When the final section is sewed on, finish off with a couple of kettle stitches down the back and cut off the thread about an inch long. This will be glued down to the spine of the book.

STEP 9. Sewing leaves the spine thicker than the rest because of the bulk of the thread. "Knock down the swell" with a mallet or hammer, embedding the threads in the folds.

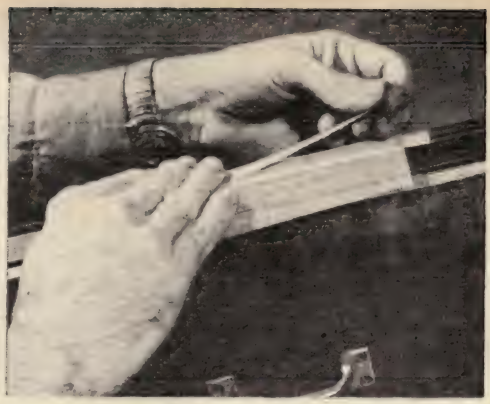
STEP 10. New endpapers may be made from regular endpaper stock (obtainable at any bookbinding supply house) or any other strong paper, even Kraft wrapping paper. The fold is made with the grain, and the folded sheet should be exactly the size of the body of the book. Protecting the face of the book with a sheet of paper, apply a ¼-in. strip of paste down the folded edge. Then lay the endpaper over the body and rub it down. Turn the body over and attach the other endpaper in the

11. AFTER APPLYING flexible glue to spine, tap it into a rounded shape before the adhesive has set

12. WITH BOOK clamped in angled backing jaws, turn edges of sections outward with glancing blows



13. ONCE SHAPING of spine is complete, apply a thin coat of flexible glue and rub it in well with fingers



14. CLOTH BACKING, or "super," should be rubbed down into glue, then covered with a strip of paper

same way. Let it dry under a pressure.

STEP 11. Normally, the book won't need trimming. However, if the sections are badly uneven, have a printer trim about an eighth of an inch from all three open edges with a guillotine. Apply a thin coat of flexible glue or Liquid Cloth to the spine. (You can make flexible glue by adding 1½ teaspoonsful of glycerine to an ounce of liquid hide glue.)

Then, before the adhesive is wholly set, tap the spine into a rounded shape with the hammer. Push in the fore edge with your thumb while drawing the top sections toward you with the fingers.

STEP 12. To complete the backing, place the body in the angled backing jaws of the press, leaving 3/16 in. of the endpapers exposed on each side. The idea here is to turn over the sections from the middle toward each side, reforming the groove noted before you tore the book down. Draw the hammer toward you with each stroke, making glancing blows that tend to turn the fold-edges of the sections toward you. Work the full length of each side of the book until a smooth, rounded spine is obtained, with edges bent over against the metal jaws of the press.

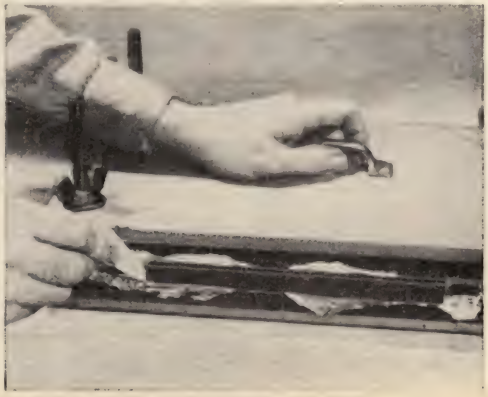
STEP 13. Apply a thin coat of flexible glue to the spine of the book and rub it in well with your fingers.

STEP 14. Prepare a piece of super (a mesh cloth) or crinoline, obtainable from a drygoods store. (Unbleached muslin can also be used, or canton flannel, stiffened by dipping in a starch solution. Iron the flannel when dry.) The super should be long enough to reach from tail kettle stitches to head kettle stitches and wide enough to overhang the book 1¼ in. on each side. Rub the cloth backing down into the glue. Now cut a strip of Kraft paper, or ordinary newspaper, as wide and as long as the book's spine, and glue it over the cloth.

STEP 15. To cover the book, you will need bookcloth or Fabrikoid, obtainable from a bookbinder's supply house. (For this you can substitute paper, leatherette, or even automobile upholstering plastic in sheet form. If the upholstering plastic

17. REMOVE CASE and turn excess cloth over edges all around, squeezing out excess glue with the folder

18. REPLACE BODY in case and clamp book in grooving jaws of press. Shape corners and let dry overnight



15. WHEN BOOKCLOTH has been cut, position body and boards on it and glue spine-size paper in place

16. WITH BODY in position, glue bookcloth to boards, working out the excess glue by rubbing with folder

has a cloth backing, remove the cloth.) Do not use ordinary cloth or anything else that will let the glue soak through and spoil the appearance of the book.

You can use the old boards or make new ones from mill board or heavy cardboard. Be sure to cut the boards with grain running from head to tail. Make them the same size as the old boards if the body wasn't trimmed; otherwise, make them as wide as the body and ¼ in. longer. When ⅛ in. is left at the back edge for the groove, the boards will overhang the fore edge ⅛ in. all around.

Cut the bookcloth to wrap completely around the book, plus ¾ in. extra at each end and ¾ in. along each side. Mark a rectangle the exact size that will be covered by the book on the inside face of the cloth, then coat it with thin runny glue. (If the glue is thick, thin it by heating in a pan of water.) Clip off all four corners of the cloth to within ⅛ in. of the corners of the rectangle.

Lay the end board on the glued cloth in exact position, then position the body of the book on the board. Cut a strip of Kraft paper as wide and as long as the book spine and glue it to the bookcloth, as shown in the photo.

STEP 16. Don't hurry! Glue sets slowly. Check everything for squareness as you go along. Lay on the front board so that it overhangs evenly all around, leaving a ⅛-in. groove between the back edge of the board and the turn-up on the book. Bring the cloth tightly over the back of the book, lay it down on the front board and rub it down with your folder. Use the rounded edge to rub in the groove. Work the folder from back edge toward fore edge and toward head and tail to work out any excess glue. (A sheet of waxed paper under the board will prevent glue from running on the edges of the book). Now, turn the book over and rub down the other side.

STEP 17. Remove the case (as the cover is called) from the body and lay it board-side up on the table. Turn the cloth over the edge all around and rub down the turn-in, squeezing out all excess glue,

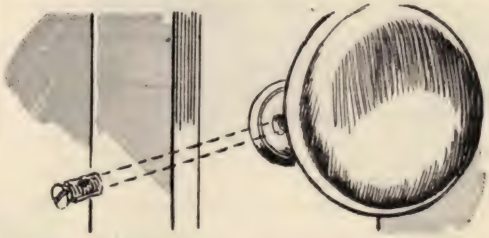
(Please turn to page 222)

19. TRIM EXCESS turn-in on boards (*not* spine) to leave about ⅜ in. around edges. Use a straightedge

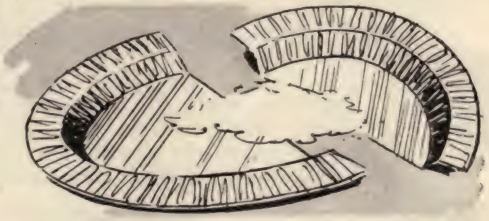
20. GLUE BOARDPAPERS to boards and place completed book in grooving jaws for final 24-hr. pressing

Solving HOME PROBLEMS

TO STORE a small ladder in the least possible space, stand it up straight against the wall between the studs in your garage. A long-arm turn button mounted on a projecting block will keep it from falling



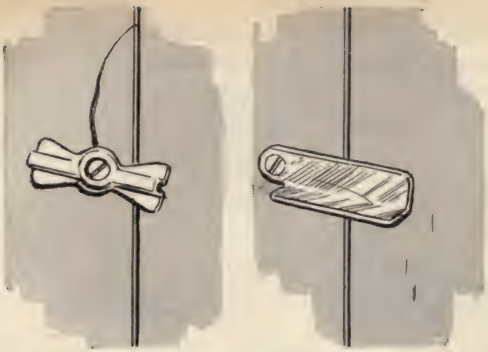
WHEN THE SETSCREW holding a doorknob works loose allowing the knob to come off, wrap the screw with a turn of cellophane tape before replacing it. The tape will tighten the grip between the threads



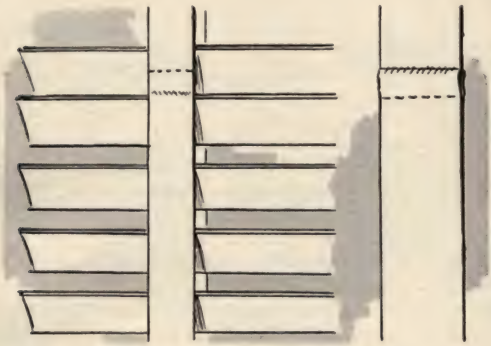
DISPOSABLE DUSTPAN is the perfect tool for cleaning up spilled food, paste or other moist materials. To make one, cut an aluminum-foil pie plate in two, leaving two thirds for pan and one third for scraper

PIN-CUSHION COLLAR on your wife's sewing machine is always handy and can't be misplaced. To make one, cut a strip of foam plastic and fasten it around the neck of the machine with glue or tape

IF YOU'RE FRESH OUT of staples for framing a picture, you can make a few by snipping wire paper clips in half. Cut them at an angle to form bevel ends. They will serve in a pinch in soft-wood frames



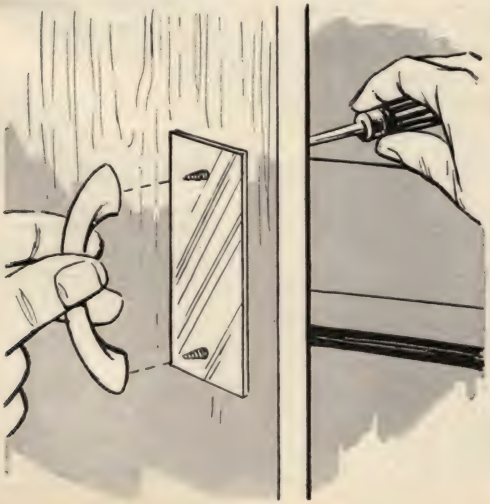
IN HAVING TO ATTACH regular turn buttons close to the edge of a window frame, the screw is apt to split the wood. This won't happen when you use offset buttons which you can make from aluminum angle



BLIND TAPES often stretch near the bottom so that the lower slats don't overlap properly. This can be remedied by sewing small tucks in the tapes where slats don't lap, thus pulling them up into place

IMPROVISED VASE made by taping two paper cups together supports long-stemmed flowers in adequate supply of water. Simply cut bottom out of one cup, invert it over other and tape in place from the inside

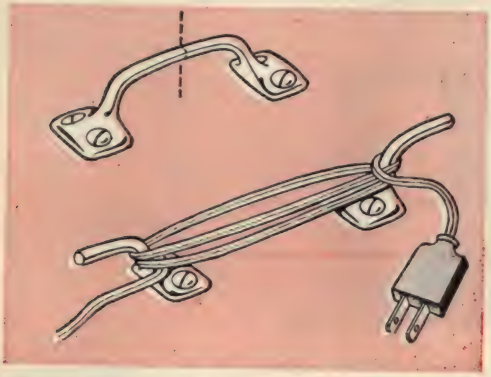
TO PROTECT FINISH behind kitchen-cabinet pulls, place a sheet of thin plastic under the pull, drilling holes in it for pull screws. This almost-invisible shield protects the finish against wear and finger smudges



SIMPLE BELT HOLDER that slips right over your closet rod is just a shower-curtain hook. Bend the leg of the pin clasp back behind hook to make it easier to remove and replace belts. Make one for each belt

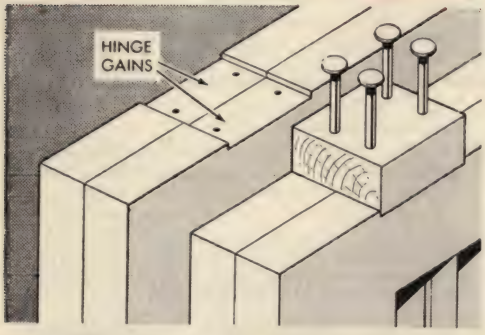
Kerf Wedge Prevents Binding

When ripping long boards with a hand saw, you can prevent the saw from binding by slipping a small wedge into the kerf behind the blade to hold the two sides apart. The steel wedge used in setting a handle in a hammer head is ideal for this purpose, and if you do much ripping, it's a good idea to keep such a wedge handy in your tool box. To make it easier to remove from the kerf, drill a small hole through the wedge near the top and insert a key ring. The ring not only serves as a handle, but also makes it easier to spot the wedge if you drop it in the grass or otherwise misplace it. You can buy hammer-handle wedges at most hardware stores.—*G. E. Hendrickson*



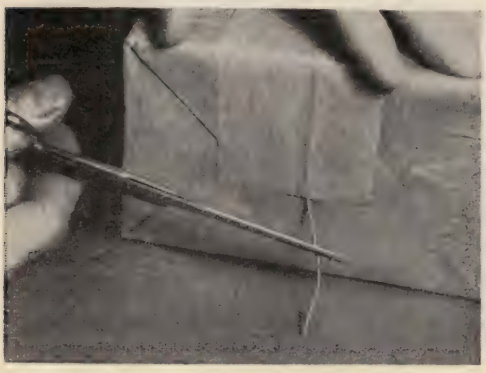
Improvised Cord Cleat

Many large portable appliances have no provisions for storing the cord. The simple cleat shown at left solves this problem with a minimum of work and expense. Just cut a window sash lift in half, smooth the cut ends by filing and bolt the two halves to the appliance to form a cleat. Such a cord holder is particularly well suited to portable fans, shop vacuum cleaners, etc., since it holds the cord neatly in place when the unit is being carried from place to place.
—*E. Wieczorak*



Marker Jig for Butt Hinges

Particularly useful in hinging louvered shutters for indoor window treatment, this jig was devised by a homeowner who found himself faced with such job involving 56 butt hinges. He cut a block of wood to fit the hinge gains of a pair of shutters and marked the location of the hinge screws on it, then drilled holes slightly undersize for nails which were driven through until the points protruded. A light tap on the nails marked all screw holes.



Add a Ripcord to Package

When sealing a package with tape, you can make it easier for the recipient to open if you place a length of cord under the tape and leave an inch or so protruding from the end. Pulling up on the cord will rip the tape neatly down the middle, unsealing the package.—*William Swallow*

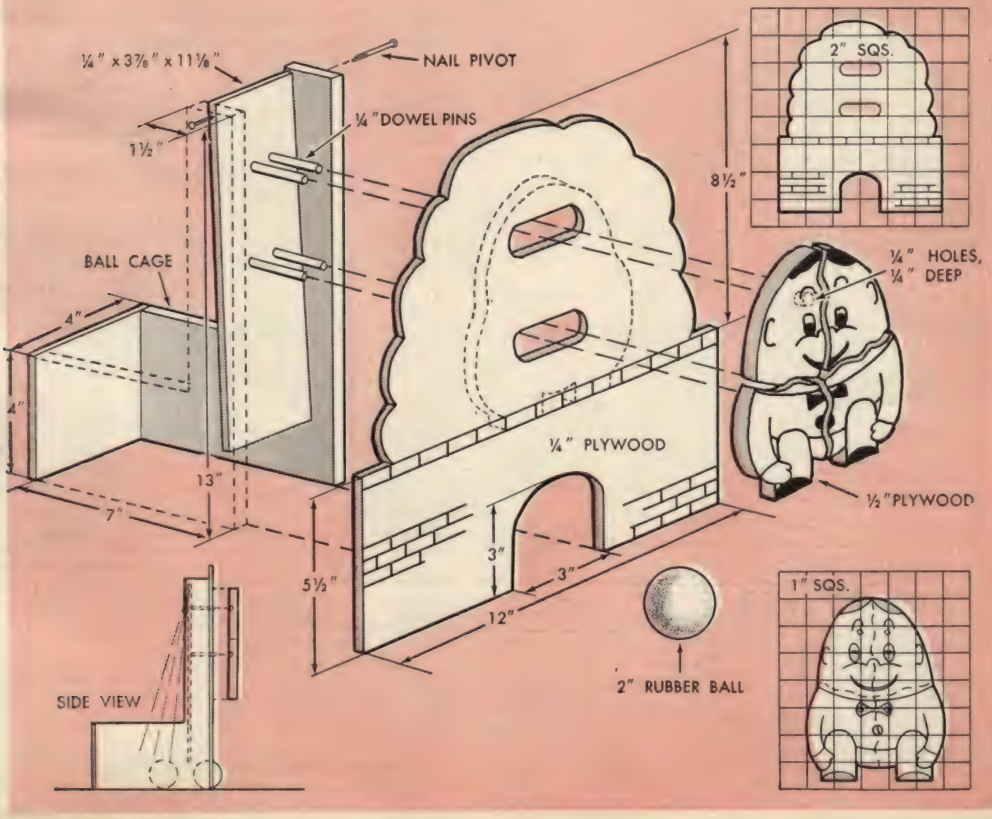
When applying wallboard with rubber-base adhesive, you can preserve a partially used can of adhesive for future use by pouring a layer of water over the remaining amount before closing the can.

HUMPTY DUMPTY

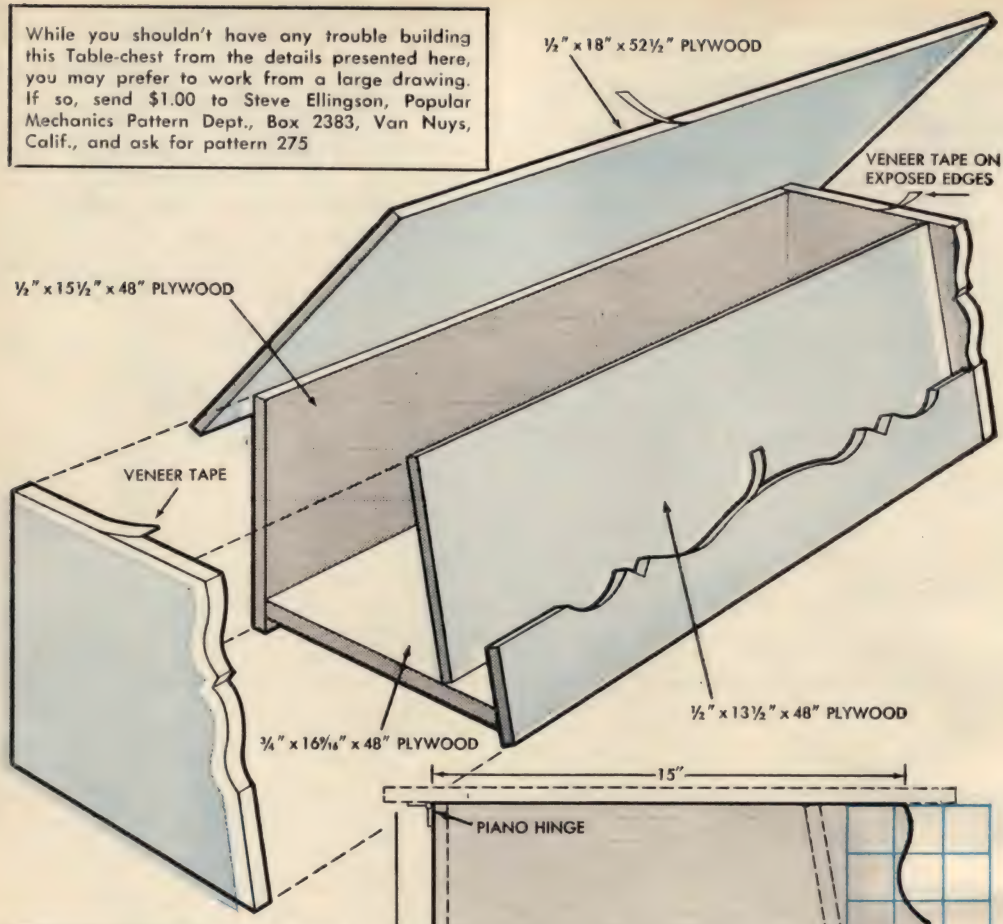
SURE TO DELIGHT your toddler, this easy-to-make toy re-enacts the famous nursery rhyme over and over again, complete with a shattering fall each time Humpty is knocked from the wall.

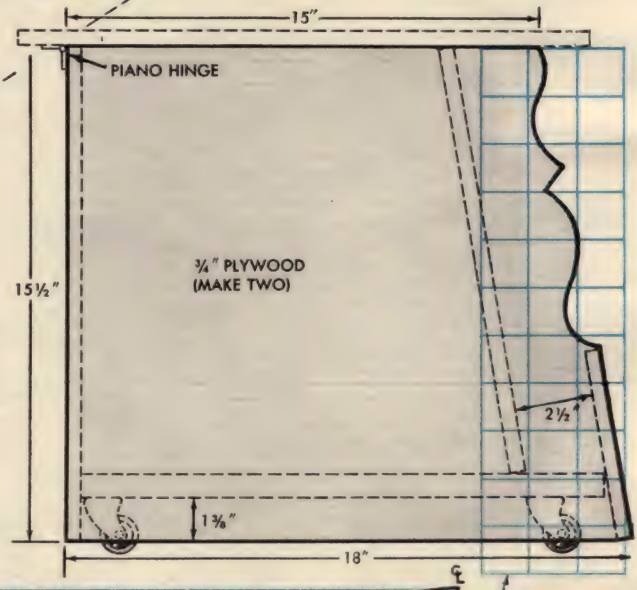
The operating principle is simple. When the rubber ball passes through the gate beneath Humpty Dumpty's feet, it hits the trigger panel which is hung on nail pivots. The panel swings back, carrying with it the four dowel-pin supports which hold Humpty Dumpty's four parts together on top of the wall. Result? A "great fall" which brings giggles of delight from the youngster who scores a bullseye.

A blind hole is made in the back of the four parts of Humpty's body to correspond with the spacing of the four supporting dowels.—*Merton H. Slutz*



While you shouldn't have any trouble building this Table-chest from the details presented here, you may prefer to work from a large drawing. If so, send $1.00 to Steve Ellingson, Popular Mechanics Pattern Dept., Box 2383, Van Nuys, Calif., and ask for pattern 275

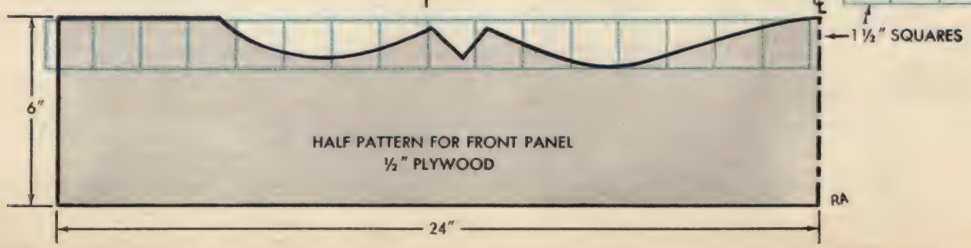




MATERIALS LIST

- 1 pc. ¾" x 18" x 32" Hardwood-veneer plywood
- 1 pc. ½" x 4' x 8' Hardwood-veneer plywood
- 1 pc. ¾" x 18" x 4' Fir plywood
- 2 pcs. Lid stops and screws
- 4 pcs. Flat-plate casters and screws
- 48" Piano hinge
- 32' 1" Veneer tape and contact cement

Glue, sandpaper, 4d. finishing nails and finishing materials



COFFEE TABLE CHEST

By Steve Ellingson

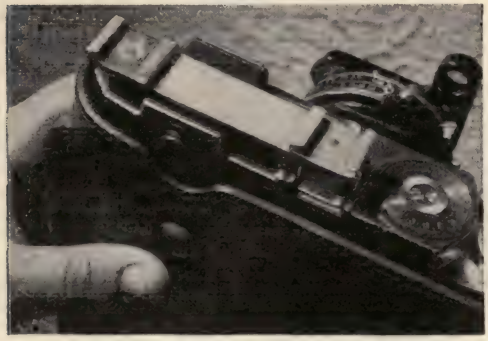
COMBINING traditional lines with modern space-conscious design, this easy-to-build table-chest combination is one of those rare pieces of furniture which can be used in almost any room of your house.

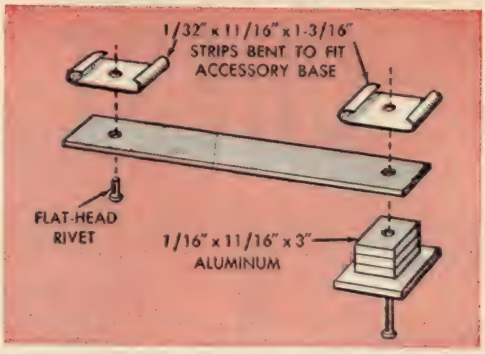
As a living-room coffee table, it not only provides a wide rack for displaying current issues of magazines, but also includes a roomy storage chest for holding bedding for that convertible sofa. And with magazines stored in the rack, the top is left uncluttered.

In the family room, the storage chest is the perfect place for games, puzzles and children's toys. In the den, it can be used for filing back issues of magazines you want to save. In the bedroom, it becomes a blanket chest, with the magazine rack providing a place for that bedtime reading material which is normally stacked on the bedside table. Small flat-plate casters elevate the chest so that it just clears the floor, making it easy for your wife to move it about when cleaning.

When applying the veneer tape, coat mating surfaces with contact cement and allow it to dry. Then place the tape over the exposed plywood edges, tap it with a hammer and block to assure a firm bond and use a sanding block wrapped with fine abrasive paper to cut it down flush with the surface.

Dual Shoe Accessory Bracket Improves Your Camera

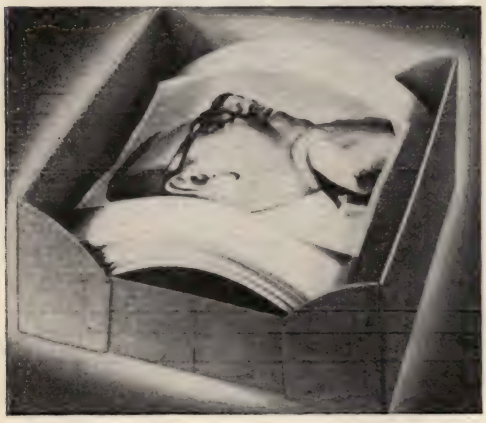




Two shoes are better than one on any camera. Suppose, for example, that you want to take some flash shots; with a dual shoe bracket it's possible to mount not only the flashgun but an accessory viewfinder as well.

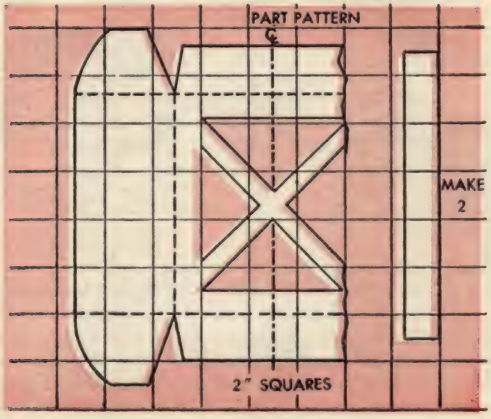
The first step is to form an aluminum foot that will fit snugly into the camera's accessory shoe. If necessary, 1/16-in.-thick aluminum spacer blocks may be stacked and riveted to the foot so that the base bar holding the two accessory shoes, will clear any projecting parts on the top of the camera. The shoes are fashioned to the proper shape from 1/32-in. stock, using the foot as a bending form.—*J. Harley Hosack*

Reverse-Curve Drying in Box Rack Produces Flat Mat Prints



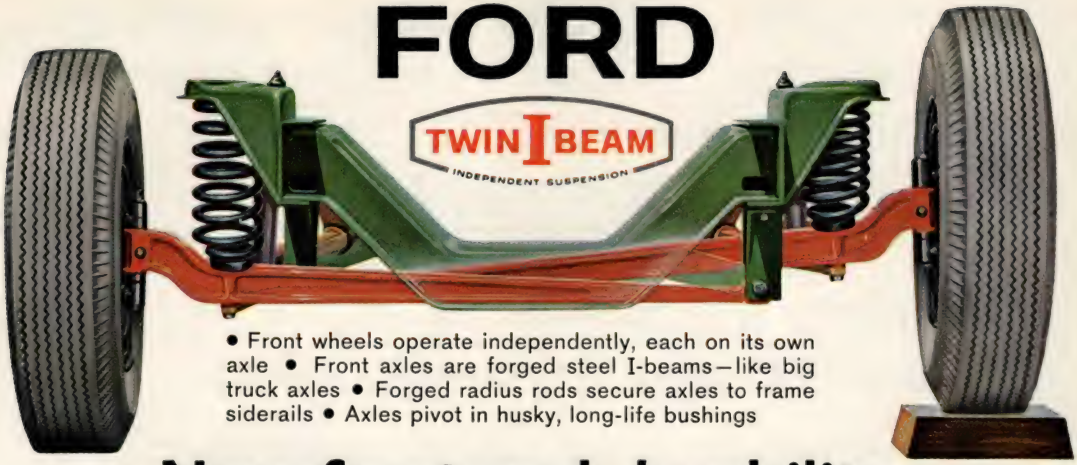
Efficient drying of portraits and other mat (non-glossy) prints is a bugaboo in most home darkrooms. Simply sponging off excess water and spreading out the prints to air dry will almost invariably cause the paper to curl badly. Even when dried between blotters weighted down with books, the prints are likely to curl.

The solution to the problem involves no expense. It is a box-like affair made of cardboard with two curved strips that support a stack of 9 x 12-in. blotters. The cardboard can be cut and folded to shape in just a few minutes, following the grid pattern shown below. Prints are dried face up, so that the backward curve will counter-act their tendency to curl.—*Jack Eisner*



FORD

TWIN I BEAM
INDEPENDENT SUSPENSION



• Front wheels operate independently, each on its own axle • Front axles are forged steel I-beams—like big truck axles • Forged radius rods secure axles to frame siderails • Axles pivot in husky, long-life bushings

New front-end durability

in a revolutionary 2-axle suspension!

Two front axles—that's the big difference in Ford's new Twin-I-Beam suspension! And what a difference they make in pickup durability and ride! Each axle is an I-beam (like the I-beams big-truck axles use) that works independently to smooth the roughest road and give you a new feel of control! Moreover, a forged radius rod holds each axle in position to maintain better wheel alignment, extend tire life!

New engine durability:

biggest straight six, most powerful V-8!

Every engine for '65 is completely new! Standard is a 240 cu. in. economy Six with seven main bearings. Optional are a new 300 cu. in. Big Six—biggest Ford Six ever built—and a 352 cu. in. V-8, most powerful engine ever offered in any Ford pickup! Experience a wonderful difference in pickup response and ride—at your Ford Dealer's!

PRODUCTS OF Ford MOTOR COMPANY

'65 FORD TWIN I BEAM INDEPENDENT SUSPENSION PICKUPS

BUILT TO LAST LONGER

Searching for an ultra-compact outboard with many "big motor" features...one good for fishing or fish-watching and that carries a 2-year warranty?

This luxury lightweight is it! The carefree, new 6 (a Sea-Horse, of course!)

This new Johnson 6 is the latest and most distinguished descendant of the first truly quiet outboard. Compared with last year's 5½ hp it is lower, lighter, lustier. The all-new styling reduces powerhead height 1½ inches, reduces weight 6 pounds. Increased compression and a change in carburetion deliver the added zing.

The complete angler's complete outboard. Every big-motor feature that can be of use on a motor of this size is "built in" to the 6. Full gear-shift, twist-grip throttle, fixed high speed carburetor jets, full range silencing and more.

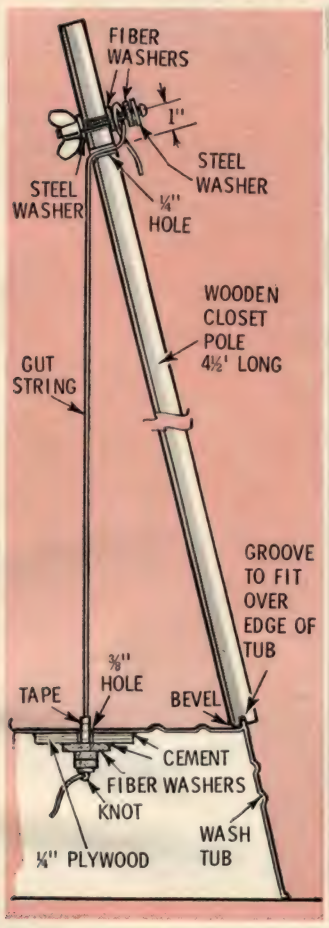
17 new models in 10 power classes. From 3 to 90 hp, not one requires special marine gas or oil. As an additional saving, all use Johnson's new 50 to 1 gas-oil mix which halves oil costs and ups spark plug life 50%. What's more, all are fully corrosion-resistant and are backed by a 2-year warranty* good for parts and labor.

For the right engine to fit your needs, see your Johnson dealer. He's in the Yellow Pages. Johnson Motors, 1939 Pershing Rd., Waukegan, Ill. Div. Outboard Marine Corp. In Canada: Johnson Motors, Peterborough, Ontario.

*For 24 months after purchase, Johnson Motors will replace, without cost to the original purchaser, any part of its manufacture which upon inspection proves to have failed in normal use due to faulty material or workmanship.

Another carefree Johnson ... first in dependability

Hootenanny Washtub Bass Fiber



THE OLD WASHTUB bass fiddle is making a comeback. More and more, when folks get together for a hootenanny, the thumping sound of this homemade instrument is heard, backing up the singers and git-tar pickers.

It's a toss-up as to whether the washtub bass is easier to play or to make. Playing it comes naturally to anyone with an ear for music. Hold the tub down by placing one foot on the tub rim (right foot if you're right handed, left foot if you're a lefty). Now, pluck the string in time to the music. To change notes, vary the tension on the string by shifting the top end of the neck back and forth. In no time at all, you'll be thumpin' along with the best of 'em.

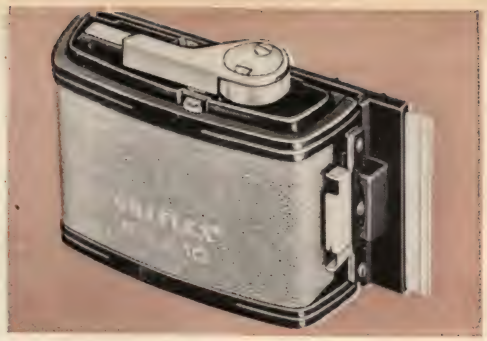
Making the fiddle is just as easy. Get a No. 1 or 2 (preferably No. 1) galvanized steel tub and drill or punch a ⅜-in. hole in the center of the bottom, for the string, and another in the side, for air escape. Cut a 5-in. plywood sounding disc and drill a ⅜-in. hole in its center then contact-cement it, plus a large fiber washer, to the underside of the tub, over the hole.

Almost any wooden pole will do for the neck, as long as it's 1¼ or 1⅜ in. in diameter. A thinner one, such as a broom handle, will tend to deaden the sound. Drill the first hole, for the ¼-in. bolt, about 4 in. down from the top. Note that the lower end of the neck is notched to fit the tub rim, and is bevelled so it can't press on the bottom of the tub.

Finally, the string, which is a standard bass-fiddle D-string is knotted at the lower end, threaded through two fiber washers and wrapped with tape to lessen wear. Then it's threaded through the bottom of the tub, through the lower hole in the neck, and between the two fiber washers on the neck bolt (see detail). The tension created as you pull on the neck will clamp the string at the top.

New for Camera Buffs

NEW ROLL-FILM HOLDER for 4 x 5 cameras slides into place like a regular sheet-film holder. It takes either 120 or 220 film. With the former, it gives 10 exposures measuring 2¼ x 2¾; with the latter it gives 20. Since this new format is proportional to 8 x 10 and 4 x 5, it requires less cropping than 2¼ x 2¼ or 2¼ x 3¼. Costs $48 from Calumet Mfg., 6550 N. Clark St., Chicago, Ill. The 220 film size, by the way, is a new one. It's the same width as standard 120 but has no paper backing. This allows more exposures on a roll. It now comes in Professional Tri-X and Ektacolor Type S. Others are expected



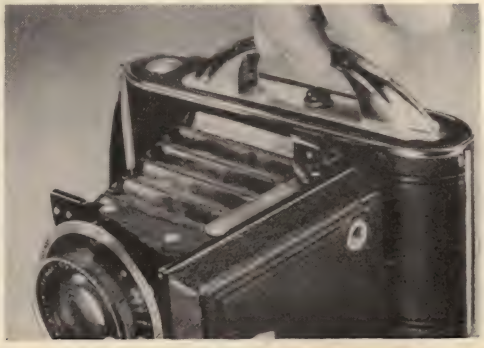
ANOTHER NEW LINE of roll-film holders accepts 120 film only, and range in format from 2¼ x 2¼ to 2¼ x 3¼. Designed for all 2¼ x 3¼ and 4 x 5 Graphic cameras, they feature lever film advances that are much faster than previous watch-the-window types. Cost under $50. Graflex, Inc., Rochester, New York

VITRONA 35-MM CAMERA features a built-in electronic flash (arrow) that operates from C-size 1.5-v. or rechargeable 1.25-v. batteries. Flash exposure is automatically set for you by a mechanism that's coupled to the focusing scale. Price, about $120. Voigtlander, 381 Park Ave. South, New York, N.Y.

PHOTO HINTS

IF YOU WEAR EYEGLASSES while using a magnifier to examine negatives or focus a view camera, the magnifier can easily scratch your glasses. This damage can be avoided, however, by applying a "cushion" of liquid rubber sealant to rim of magnifier

A CONVENIENT HANDLE for many cameras can be made from an ordinary drawer pull. Fasten the pull to a strip of sheet metal which has been drilled with a 5/16-in. hole to coincide with the camera's tripod socket. To avoid damaging the tripod socket, be sure the 1/4-20 screw used to fasten the handle to the camera is short enough so it can't bottom

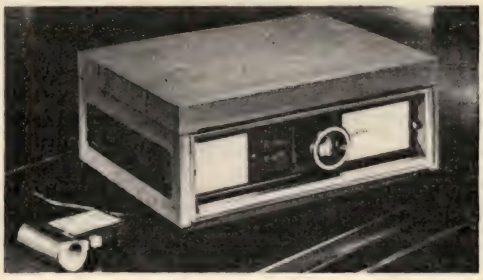


TRIPLE FOCAL LENGTH of your telephoto lens with this 3x tele converter. You attach it to lens mount of a 35-mm single-lens reflex, then attach telephoto to the converter. A 105-mm lens becomes a 315-mm. A 135-mm becomes a 405-mm. Fits or adapts to many cameras. Costs $29.95. Allied Impex, 300 Park Ave. South, N. Y., N.Y.

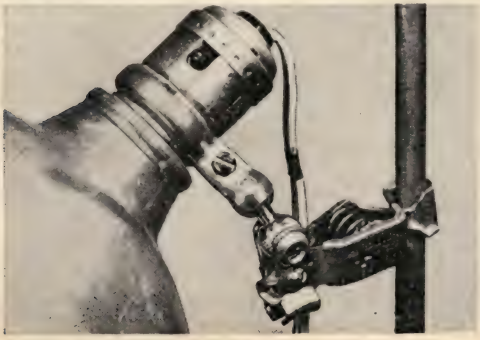
POINT AND SHOOT: The electric eye of the Alpa 9d uses three CdS cells instead of one to read light over the entire picture area. This gives you accurate exposures, even in light conditions that baffle other types of automatic exposure adjustments. Camera costs $532.27. Karl Heitz, Inc., 979 3rd Ave., N.Y., N.Y.

DUAL-RANGE LENS HOOD works in extended position (below) or collapsed. This permits its use with both normal and telephoto lenses. Available in series or custom sizes to fit on all single-lens reflex focal-plane cameras. Priced from $2.99 to $7.99. Spiratone, 135-06 Northern Boulevard, Flushing, New York

YOU DON'T HAVE TO HIDE the Model 573 "Decor" projector in a cabinet or closet after each slide show because it's styled to blend with living room decor. The unit takes 35-mm slides, changes them automatically at intervals of 4, 8, 16 and 32 sec. Under $150. Argus, Inc., 595 W. Touhy Ave., Chicago, Ill.

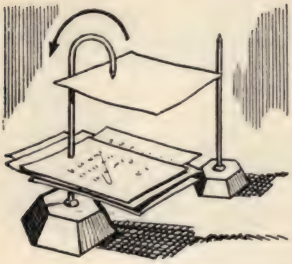


TO PUT A SECOND OR THIRD PHOTOFLOOD on your light stand, take the socket band and swivel assembly from a spring-type reflector clamp and fasten them to a 2⅞-in. battery clip as shown below. The clip jaws will hold tightly to most light stand shafts. Once you've placed the light on the stand, you can quickly move it up or down by just squeezing the clip

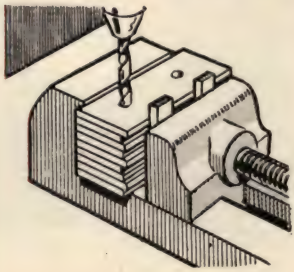


THE INEVITABLE CLUTTER that gathers in the bottom of a gadget case can be reduced by tacking a strip of inner tube or strong elastic inside the case near the top. Tack the strip in such a way as to create a series of loops. These loops will hold a wide variety of small items, such as extra film, lens brushes, filter cases and the like, within easy reach

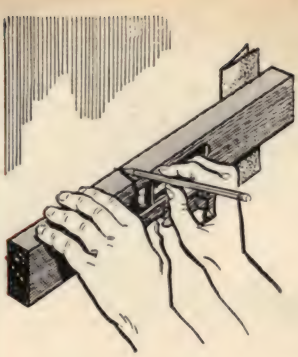
TAKE A HINT FROM READERS



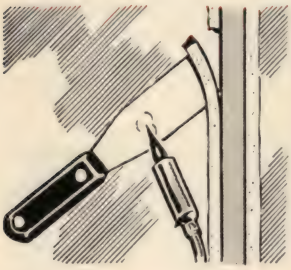
THE SHARP, SPIKE-POINT of a paper spindle, the type used for filing bills, is a hazard to unwary hands. Bending spindle downward into hook shape as shown eliminates the danger without sacrificing convenience



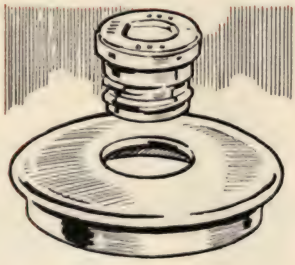
NEED TO STACK steel strips in a vise for gang drilling? Two lead or copper bars placed between the movable vise jaw and strips will conform to slight irregularities in the width of the work and hold the stack tightly



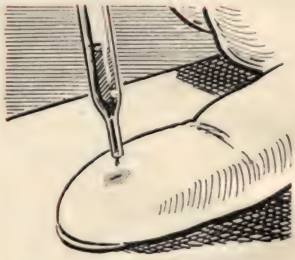
WHEN YOU HOLD a level against a wall for marking a horizontal line, the level is likely to slip. Placing a folded piece of sandpaper, grit side outward, between wall and level prevents accidental movement



HEAT'S THE THING when removing putty from a sash, but the wood may char if the torch is applied directly. Instead, play flame against the blade of a putty knife while you use corner of the blade to remove putty

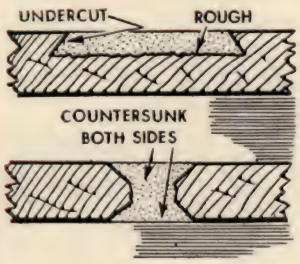


IF THE GLASS top of your percolator breaks, you can still have Sunday morning coffee if you improvise a new top by removing the glass shell of a burned out fuse. The glass shell is made of Pyrex and fits hole perfectly

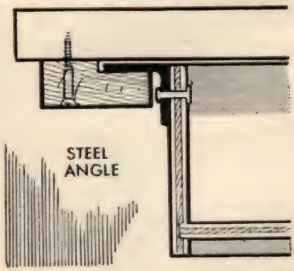


OFTEN when you are handling lumber, tiny, hard-to-see splinters become embedded in your fingers. Locating the splinters for removal is easier if you apply a drop of iodine to the spot. Stain makes splinter visible

PAINTING A ROOM? Try slipping an old pair of large socks over your shoes to protect the shoes from spatter. The socks let you wipe up paint drops from floor without stooping or hunting for a wiping cloth



WHEN FILLING a hole in either plywood or solid stock, the wood putty is "locked in" when the sides of the hole are undercut and the surface roughened as shown. If hole extends thru material, countersink both sides



HANG A DRAWER under your workbench by riveting a 1-in. steel angle to both sides of the drawer. The angles slide on two 1 x 2-in. strips that are cut as indicated and attached with screws to underside of bench

Silencing Squeaks In Hardwood Floors

By Steven J. Howard

RECENTLY, I made a survey of 75 homeowners in my community. "Name the No. 1 nuisance in your house," I requested.

About half of the men complained of moisture problems (fogged windows or a wet basement), 40 listed leaky faucets—and 15 said: "My wife!" But *one* problem appeared on *every* list, and topped most of them: squeaky floors.

When I pressed the issue, I found that only a couple of these men had ever tried to *silence* those annoying squeaks. The rest assumed that a noisy floor—like taxes—is something you just have to put up with. This isn't true, of course. There are a number of ways to chase a squeak—and none of them involve much of an investment in time or cash.

Neglecting the problem doesn't mean your house is going to fall apart. But squeaky floors don't get better with time. Far from it, they get worse.

The trouble is widespread because of the way all floors are constructed—and because a natural enemy of wood is present in most homes, all winter long. This enemy is dry air. It pulls moisture from wood and causes shrinkage which, in turn, causes loose fitting. The result is bounce, sag, squeaks and creaks. It's particularly bad if the builder of your house used green lumber for the flooring—or left it exposed to the weather.

In times of high humidity — usually during the summer when your home isn't artificially heated—the winter-dried wood gains back some moisture, but never enough to counteract what's been taken from it. Once that wood shrinks, it seldom returns to its original tight-fitting form. However, one of the homeowners I surveyed does swear that his squeaky floor problem cleared up when he installed a good humidifier. (For a discussion of the virtues of humidification during the heating season, see *PM*'s December, 1963 issue.)

On the other hand, if a wood floor is laid too tight to start with, excess humidity

ATTACK FROM BELOW

ONCE SQUEAK is located, check to see if shrink or sag has opened gap between subfloor and supporting joist. If so, drive shim into it—a wood shingle is ideal. If dipped in glue first, shim won't work back out

CROSS-BRIDGING that's butted tightly can cause a squeak when walked over. Movement of floor causes pieces to rub against each other. Easy way to separate them is to run a saw blade between edges

can result in swelling, which causes the hardwood strips to buckle. This opens a gap between the hardwood strips and the subflooring—a gap which closes only when you walk over it; and it closes with a loud protest!

Basically, a floor consists of two layers, and a squeak can originate in either of them. (We're not concerned, here, with floor coverings. If your floor happens to be surfaced with tile or linoleum or carpeting, the squeak still comes from the wood beneath. You can attack from below in the case of a first floor over an unfinished basement or a crawl space; otherwise, you'll probably have to lift the covering to get to work on that squeak.)

Companies that produce wood flooring materials are all agreed that the most common sound-source is the movement of the tongue of one flooring strip in the groove of its neighbor, as the result of wood shrinkage or swelling.

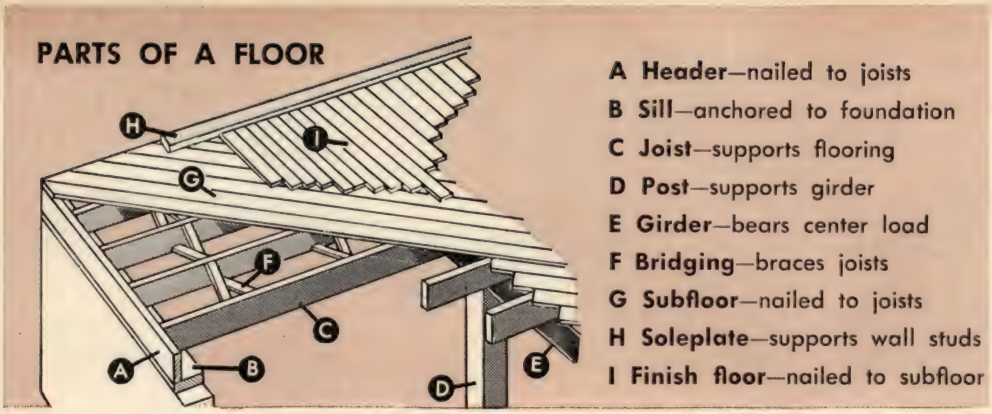
If this is your problem, simple lubrication may take care of the squeak—at least for awhile. Try squirting powdered graphite in the joints between flooring strips. If this doesn't work, force in a little liquid soap, using a clean oil can.

But suppose you live in a fairly new house—one where there's scarcely been time for the flooring to shrink. Yet recently, as you walk around, you notice a lot of barely audible squeaks. They're too many and too scattered to "lubricate"—the condition is simply a sign that the wood is starting to dry out.

These minor irritations can often be eliminated with a coat of penetrating floor sealer, brushed on with the grain. Work the sealer in between the floorboard joints as best you can, let it set a few minutes, then wipe off the excess *across* the grain. Follow this up, next day, by flowing on floor finish across the grain, with only your final, light strokes brushed *with* the grain, for appearance.

Another source of squeaks and sags is a *subfloor* that dries out and shrinks away from supporting joists. Where you can attack the problem from a basement or a crawl space, have someone walk around on top, as you listen from below. This lets you spot the area of the noise. If there's a gap between floor and joist at that point, shim it as shown at top left. If the gap is wide, try several shims, side by side.

Bridging is another possible source of noise. Where crossed pieces touch each other, they can rub, when weight is put on from above, producing a chirp the way a cricket does with its back legs. After you find which pair of bridging is at fault, you shave the pieces apart with a saw, as shown bottom left.



FLOOR CONSTRUCTION takes many forms, but this one is most common (in older homes) for both ground floor over basement and suspended second floor. In modern homes, subflooring is often solid plywood panels (quicker to lay, less likely to squeak). If boards (t&g or plain), as here, it may also be laid at right angles to joists. If girder supports a load-bearing wall, wall's sole plate may rest directly on it, not on top of subfloor

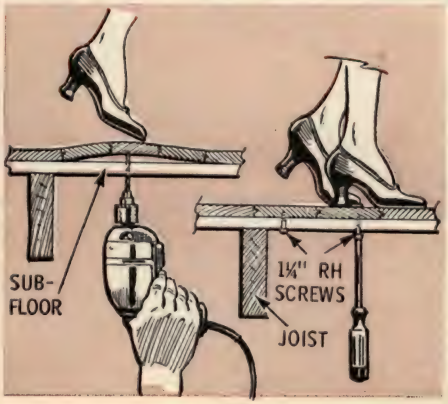
While you're at it, make sure bridging is nailed tightly in place. If you can move any of the strips by hand, bang several nails through them and into the joists until they're anchored solid. Not all houses have bridging, but when it's used you can be sure it's important to strengthen floor structure by keeping joists from twisting.

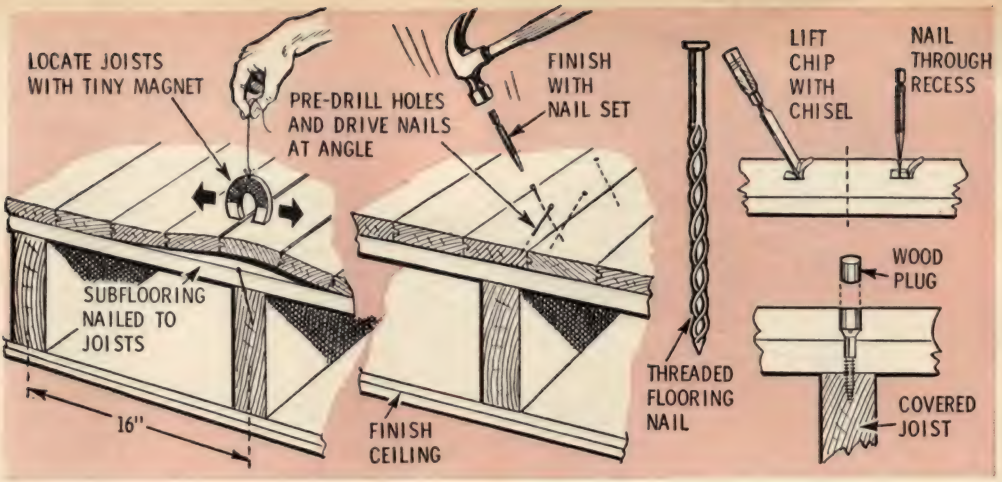
As I said before, flooring strips that rub together tongue to groove, and those that are warped, loose or inadequately nailed, are common causes of persistent squeaking. Again, where possible, attack the problem from under the floor, as in the photos and sketches below.

If floor strips are nailed directly to the subfloor, No. 10 round-head screws will usually do the job. First locate the squeaky board (or boards) by having someone walk on the floor above. You'll want to drill clearance holes that will pass the screw's threads through the subflooring. To avoid breaking through the top surface of the finish flooring (and into the foot of your helper, up there!) you'd better equip your bit with a depth stop. The simplest way to do this is to drill first through a small block that will leave the right length of bit protruding when the block seats against the chuck. Round-head screws are used because the flat shoulder prevents sinking the head into the subflooring, so keeps the tip of screw from passing on through the finish flooring. You want it to enter the squeaky strip only far enough to get a good bite that will pull the board tight against the subflooring. Where the subfloor is ¾ in. thick, a 1¼-in. screw does the best job. If the subfloor is thinner stock, try a ⅞ or 1-in. screw.

Turn the screw up snug while your helper puts full weight on the strip from above. Drive in as many screws as necessary to stop the squeak—but let's be practical. If more than four or five screws placed about four inches apart don't do

HOW TO TIE DOWN BUCKLED FLOORING



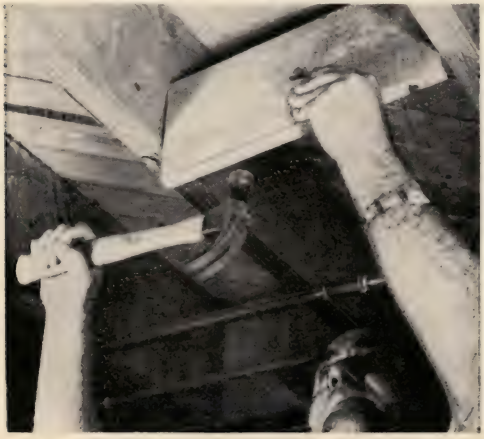


the job, you're either screwing into the wrong board or the squeak can't be conveniently eliminated in this manner.

There's one other thing to try before you give up the attack: Drill bigger holes through the subfloor—large enough to take the nozzle of a caulking or grease gun—and force thinly-mixed crack filler into the space between sub- and finish flooring. This may kill the squeak by keeping the floor strips from moving when stepped on.

The caulking stunt won't work, of course, in those rare instances where hardwood flooring is laid on sleepers, creating a permanent space between the sub- and finish floor. Sleepers are staggered nailing strips, commonly laid on a cement floor for the same reason you'd apply furring strips to a basement wall before you put up paneling. But you may encounter sleepers in above-grade floors in older homes.

FLOOR SAGGING under piano? Stiffen it with solid bridging. Cut stock lumber (1x8, 1x10, 1x12) for tight fit between joists, drive up against subfloor



You'll know with the first pilot hole you drill: if the bit breaks free and jumps ahead after the first ¾ in., you're into sleeper space, and will have to tie down those squeaking floorboards with longer (probably 2-in.) round-head screws.

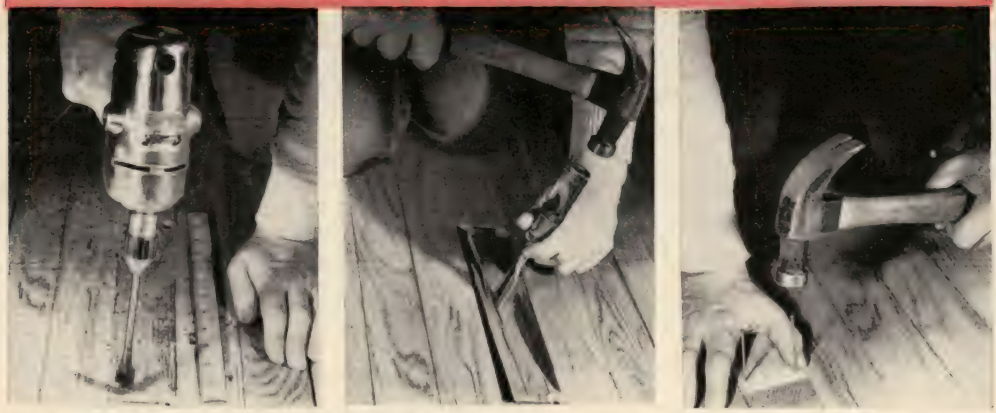
The problem of silencing floor squeaks is greater in homes where there's no basement or crawl space—or on the second floor, where you can't get at the subflooring because of the ceiling below it. Here, you must work from above, and your best bet is additional fastening. The big job is to find something into which you can drive nails, and this means locating nails already in the floor. You can do this with a small magnet hung on a string and moved along the squeaky floor board. When you feel or see a slight tug, you're over a nail—which means you're over the joist that the subfloor's nailed to. (You can also buy commercial stud and joist finders that work on this magnetic principle.

Drill a small pilot hole through the flooring at an angle and into the joist. Drive in finishing nails and countersink them below the surface of the floor. Try at least two, but again, don't pepper the floor with nailheads. For better holding power, you may want to buy threaded flooring nails. There are two types—the spiral-thread, shown above, or a barbed-ring type. The small holes left by the nails can be filled with a wood filler and dabbed over with shellac or varnish.

If nailing doesn't do the job, maybe the maximum holding power of one or two screws will. Find the joist, as before. Drill pilot holes to accommodate 1¼-in. flathead screws. Counterbore the holes to sink the heads and drive the screws firmly in place. The holes can be filled with a wood filler or wooden plug, which can be dabbed with a varnish to match the floor.

When squeaks resist these anchoring

PATCHING A HARDWOOD STRIP FLOOR



UGLY STAIN, split or gouge can be removed by patching. Measure off damaged area—no less than 10 in. long—and drill large-diameter hole at each corner, stopping short of subfloor. With sharp chisel, make cut across ruined strip or strips between holes, then split out wood. Cut new strip for snug fit, nail each corner

methods, perhaps your problem is greater than localized shrinkage or warp. A large part of the floor may be sagging under a weight that's too heavy for the existing supports. The solution to *structural* squeaks is to strengthen the floor. The simplest way to do this is to tie the joists together with solid bridging, as shown lower left. Such a brace must be toenailed to both joists.

If this doesn't work, you may have to resort to floor jacks to support the sagging area. The best kind are the steel ones sold in lumber yards and home supply outlets for about $6.50 apiece. They're adjustable and can be shoved firmly up against the sagging area as much as is needed to get rid of the sag. You can, of course, simply drive a 4x4 post in under the sag, if the situation makes this feasible.

If you live in an older home, wide cracks may have opened up between floorboards or, for that matter, floorboards may have suffered wood rot. Manufacturers have told me that wide cracks are a direct result of faulty workmanship in laying the floor since little regard may have been given to moisture control.

According to one of these manufacturers, E. L. Bruce Co. of Memphis, Tennessee, "the physical characteristics of wood flooring are such that satisfactory and permanent installation cannot be assured without positive moisture control. Subflooring should be of dry stock. Expansion space should be left under base and shoe mold at all wall lines. The floor must be free to expand and contract with seasonal variations in humidity."

In addition, maximum protection against moisture can be afforded new flooring by back-painting the wood with a moisture-resistant paint, such as aluminum paint, prior to installation.

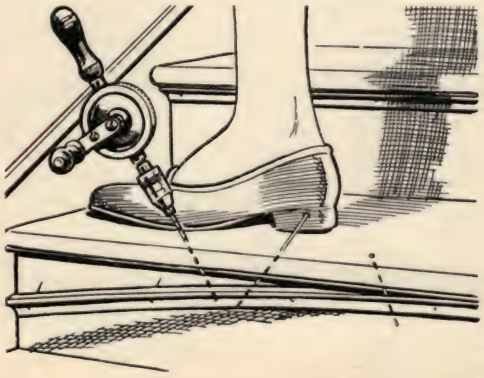
Suppose, though, that you're unlucky enough to have these gaps. You'll note that if this happens, the cracks open wider in the winter when wood has a minimum moisture content and become narrower in summer when wood becomes more moist. Is there anything to do about it?

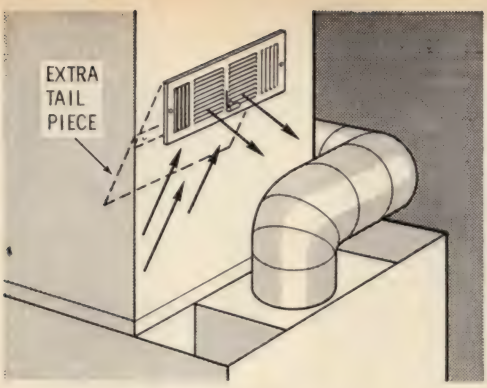
I hate to tell you this, but the answer is

(Please turn to page 219)

SILENCING STAIR TREADS

INDOOR STAIRWAYS often squeak because tread rubs against riser. This play is caused by inadequate nailing, which has let the tread lift. To close gap, pry loose molding under tread's lip and have your helper put full weight on tread while you drill diagonally through it into riser with a 7/64-in. bit, then drive 10d resin-coated flooring nails in place. Re-attach molding before weight is removed. Threaded nails—or screws—are best for treads with stubborn warp. Glue in a wood plug over countersunk screw heads

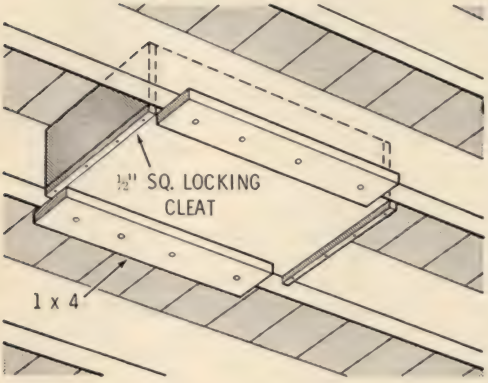




Deflector Extension Boosts Heat

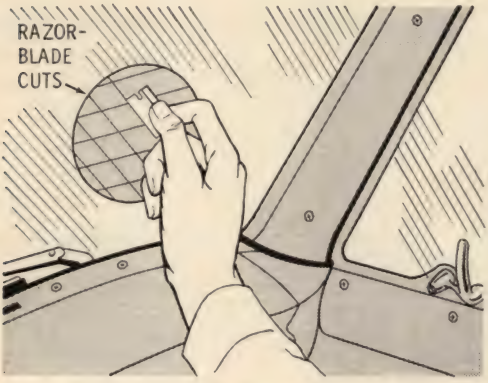
I wanted more heat in our basement playroom, but didn't want to install additional vents. Instead, I decided to try to boost the hot air output of the existing register in the furnace plenum. I found that all I had to do was extend the heat deflector of the grill so that more hot air would be deflected outward. Having no sheet metal, I cut open an anti-freeze can and wound up with a piece about 12 x 18 in. which I flattened and fastened to the tail piece with sheet metal screws.

—George Mayerchak



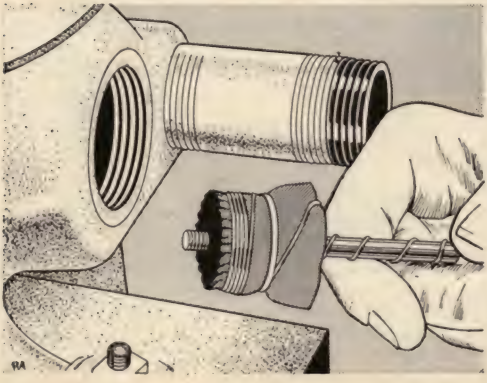
Extra Storage with Joist Drawers

We were rapidly running out of storage room in our home when I hit on the idea of utilizing the space between the floor joists in the basement. After centering and nailing 1x4 runners to the edges of two joists, I constructed a plywood drawer to fit between the joists. The drawer measured approximately 6¼ x 14½ x 24 in, For safety, I fastened a strip across each end to "lock" it in place. The drawer is removed by lifting it so that the strips can clear the end cleats. The space is ideal for seldom-used items.—*A. Malone*



Stumping Sticker Snitchers

On the inside of my car windshield I have a sticker indicating membership in a country club. Admission to the club facilities requires no proof of membership other than the sticker. In order to prevent someone from peeling off the sticker and using it without club authorization, I made a number of diagonal razor cuts on the back. These cross cuts make it impossible to remove the sticker without it coming off in small pieces.—*Joseph Braunstein*



Pump Repair Kink

Attempting to install double piston leathers in an electric water pump is tough because the leathers are oversize and often stiff. A solution is to compress the first leather to a smaller diameter than the cylinder bore by wrapping it with fishing line. After bolting the leathers together, turn them onto a long bolt so you can hold them in a vise while you tightly wrap about a foot of 40-lb.-test monofilament around the first leather. Then install the assembly in the bore, slowly pull out the line, and unscrew the bolt.—*R. Micals*

PLUG SERVICING is done with mechanical cleaners and testers. They are available individually or in combination units which do both. Here, a plug is being cleaned by abrasive action similar to sand blasting

LET YOUR SPARK PLUGS BE YOUR BUILT-IN

ENGINE ANALYZERS

By Morton J. Schultz

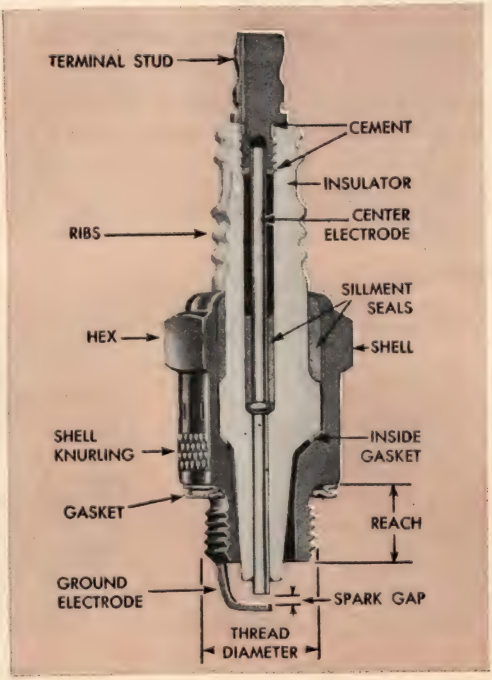
DID YOU KNOW that your car has a set of built-in analyzers that can tell you a great deal about the engine's performance? Well, it does, and they're among the simplest parts in the car's engine—the spark plugs.

The motorist who services his own plugs, by examining them carefully, has an excellent opportunity to gain valuable insight into the operation of his engine. And, in most cases, once the trouble indicated by examination of the plugs has been corrected, the plugs usually can be restored to service—no matter how much mileage they've seen.

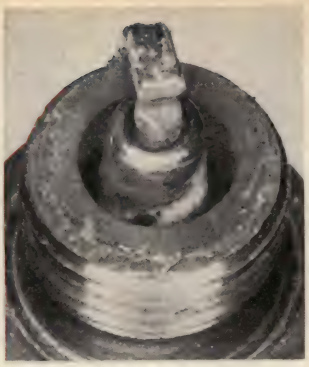
Before getting into service and how to analyze the plugs' appearance, you'll first want to bone up on spark plug nomenclature. The drawing on this page shows a typical plug and the names of its parts.

Secondly, you'll want to know how often to service the plugs. Most manufacturers suggest every 5,000 miles.

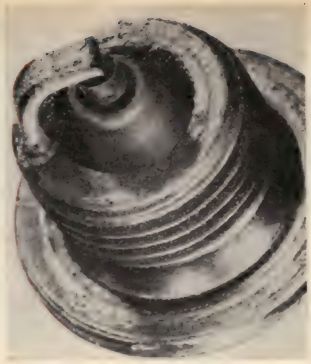
How about sophisticated service equipment, such as an ignition scope and plug



1



2



3

4

5

6

7

8

9

10

11

12

SPARK PLUG ANALYSIS CHART

CONDITION OF PLUG	APPEARANCE	MALFUNCTION	CORRECTION
Normal (Figure 1)	Light tan or brown deposits. Gap increase of .001 inch or less for every 1000 miles of operation	None	If electrodes don't show excessive wear, clean and restore plugs to service
Lead fouling (Figure 2)	Dark gray, black, yellow or tan cindery deposits, or a shiny glaze coating of the same colored deposits	Accumulation of byproducts of fuel combustion at high speed and under heavy load conditions	Clean and recondition plugs. If condition continues you may have to change to plugs of colder range
Carbon fouling (Figure 3)	Black, dry, fluffy carbon on tip	If only a couple of plugs are found like this, check for bad high tension lead, burnt or sticky valve, faulty breaker point, weak coil or condenser. If all plugs are in this condition, troubleshoot for too lean a fuel mixture, inoperative automatic choke, dirty or clogged air cleaner, stuck manifold heat control valve, or too much stop-go operation	Correct defect found in troubleshooting. Clean and restore plugs to service. If fouling is caused by excessive idling or stop-go operation, replace plugs with next hottest in the heat range
Oil fouling (Figure 4)	Wet, black, oily deposits	Can occur in a new or rebuilt engine before piston rings have become properly seated. In older cars, it indicates worn rings, cylinders, pistons, valve guides	If it's a new or rebuilt engine, degrease plugs, clean and restore to service. In older engines, correct the cause of oil consumption—otherwise cleaning or replacing plugs will only be a temporary help. Use of hotter plugs in engines with excessive oil fouling usually permits longer periods of service until defect is corrected
Overheating of plug (Figure 5)	White insulator tip, bluish-burnt cast on center and ground electrodes, too much electrode corrosion after short period of operation	Incorrect plug heat range, over-advanced ignition timing, too lean a fuel mixture, or inoperative or partially clogged cooling system	Check heat of plugs against that recommended for your car. Make any repairs indicated, and install new plugs of the heat range demanded. Discard old plugs
Gap bridging (Figure 6)	Deposit lodged between ground and center electrodes	Improper fuel combustion. Or deposits shredded from combustion chamber during rapid acceleration or high speed operation, thrown against hot electrodes and fused on contact to short out plug	Check fuel mixture. Clean and restore the plugs to service
Initial pre-ignition (Figure 7)	Melting of center electrode and, later, of ground electrode. Also blistered insulator, and/or aluminum or metallic deposits on insulator	Incorrect plug heat range, burned valves, over-advanced timing, inoperative or partially clogged cooling system, lean fuel mixture, or detonation caused by improper octane rating or low grade of fuel	Check heat range of plugs against that recommended for your car. Repair or replace faulty engine components. Replace plugs with those of correct heat range. These old plugs can't be restored to service
Sustained pre-ignition (Figure 8)	Ceramic firing tip melted	All the conditions described above, but allowed to continue for a longer time. By this time, there's a good chance that other engine components have been damaged by pre-ignition	Check engine carefully, and repair or replace damaged parts. Replace plugs with those of the correct heat range
Chipped insulator (Figure 9)	Cracked, split or chipped insulator at firing end	Excessive center electrode temperature or severe engine detonation. However, a defect of this sort is usually caused by use of incorrect gapping procedure—generally, bending the center electrode	Replace the plug. Make sure the correct gapping procedure is used. Check and set the timing. If the condition recurs, switch to a colder plug
Broken insulator (Figure 10)	Broken insulator	Foreign object in the combustion chamber. Since small objects can travel from one cylinder to another because of valve overlap, always check other cylinders as well to prevent recurrence of damage	Purge cylinders of foreign matter and replace the plug. This one can't be reused
Splash fouling (Figure 11)	Splotchy deposits on insulator	Long-delayed tuneup needed	Tuneup car and clean the plugs. Restore plugs to service
Scavenger deposits (Figure 12)	White or yellow accumulation around tip and on ground electrode	Normal with certain brands of fuel	Although deposits appear heavy, they can be easily flaked off. Clean, restore plugs to service
Dishing (Figure 13, page 182)	Ground electrode is cupped or dished	Reverse polarity	Check primary coil leads and switch, if necessary, to correct polarity. Check gap. If it's not excessive, restore plug to service after routine cleaning and reconditioning
Worn-out (Figure 14, page 182)	Severely eroded or worn center and ground electrodes. Light brown to tan deposits on insulator	Normal when gap wears at rate of .001" for every 1000 miles of operation	If you can re-gap to specifications, you can keep the plug in service by cleaning and reconditioning. However, if gap growth exceeds .010", replace the plug

cleaner and indicator, like the pro's use?

Well, an ignition scope costs about $85. It's nice to have, but not necessary. According to the plug manufacturers, careful visual examination is effective.

On the other hand, a spark plug *cleaner* (photo, page 179) is usually needed to blast foreign matter away from the cylinders. But don't go out and buy one. Most gas stations have these, and the station you give your business to will often let you use it gratis. The indicator portion of the cleaner can tell you much, also, as you'll soon see.

Plug service involves four general steps, each having its own tricks of the trade. They are: removal, analysis, cleaning (or replacing with new ones), and installing.

Removal. Start by pulling the plug wire from the plug. In doing so be sure to grasp the *terminal boot*—not the wire itself—or you may rip its internal strands apart. Next, use a deep-well socket, an extension (if required), and a ratchet handle to loosen each plug only a turn or two. Then, before turning the plugs out by hand blow any dirt from around each plug with an air pressure hose. This keeps dirt and foreign matter from getting into the cylinder head threads. If an air hose isn't available, use a brush, not a rag, to clean the dirt away.

Upon removing each plug, write on the insulator the number of the cylinder from which it came, using a felt marker or grease pencil. This is important since each plug is a barometer of engine condition as it applies to the cylinder from which it came. The marking can be wiped off easily before re-installation of the plugs. Incidentally, throw away the old gaskets, even if you keep the plugs in service. A collapsed old gasket might prevent firm reseating of the plug and lead to combustion gas leaks that can over-heat the spark plug and cause pre-ignition.

Analyzing. Examine the tip of each plug carefully. The chart on page 181 and the accompanying pictures tell you what to look for and what the appearance of the tip indicates about engine performance.

Cleaning and Restoring. The next phase of spark plug service involves a series of easily followed steps:

1. If the spark plug tip is oily, solvent clean and dry it before using the cleaner. Otherwise the abrasive given off by the cleaner can pack itself around the insulator tip. If the plug is then re-installed some of these particles can work loose and damage the cylinder wall and piston.

13

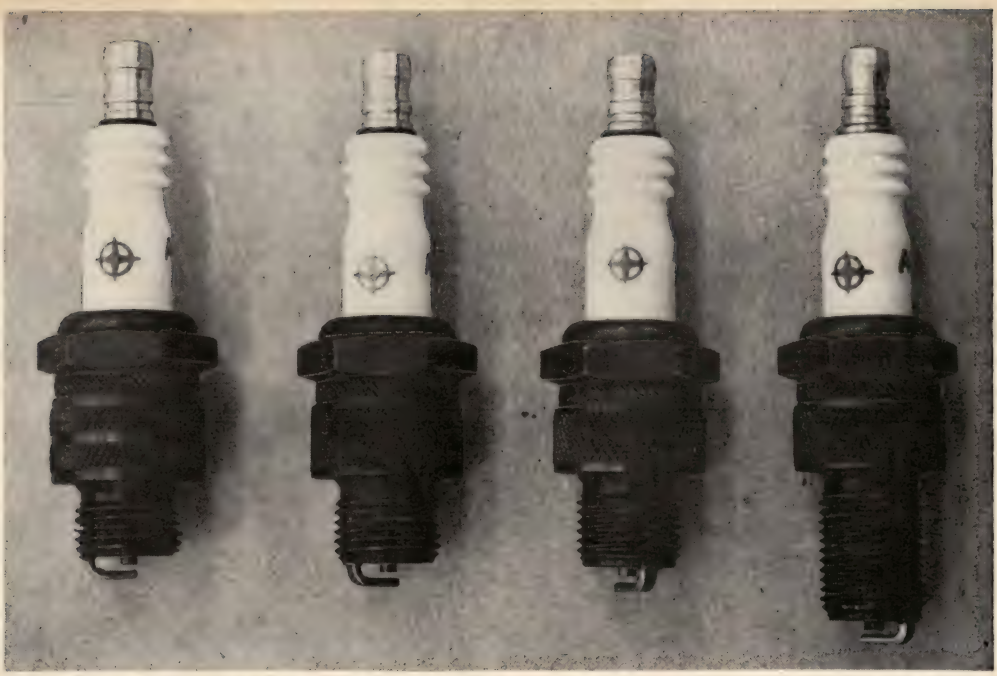
14

ALWAYS RE-GAP plugs with round-wire gauge. A flat gauge can "bridge" erosion pits on electrodes and give a reading that's smaller than actual gap

BEFORE RE-GAPPING, open the ground electrode slightly and file it, plus center electrode, flat and square. Surfaces of electrodes should be parallel

As a matter of fact, you should really clean the entire plug in a spark plug cleaning solvent to remove dirt and/or rust from the threads and insulator. If this obliterates your identifying mark, simply rewrite the mark. To dry the plug after washing, especially the firing end, play a blast from an air pressure hose over it.

2. Insert each plug in the cleaner portion of the cleaning machine. Abrasive-blast the plug for about five seconds, rotating it as you do. Remove the plug and examine the tip for cleanliness. If necessary, blast it again until clean. If, when examining the clean tip, you see any hairline cracks,



EVEN THOUGH SPARK PLUGS may have the same thread diameter, as above, their reaches, or thread lengths, can vary widely. So be sure to check manufacturer's specs to find right thread length for your car

discard the plug without further ado.

3. With a bending tool, which is usually part of an approved spark plug gapping tool, open the ground electrode slightly and file both the ground and center electrodes until they're flat, square and bright with a point file. Adjust the ground electrode until it's parallel to the other. *Don't* use pliers for bending. Also, never bend or apply any pressure to the center electrode or to the insulator. This can split or crack the insulator tip. Bend only the ground electrode.

4. Use a round-wire-type spark plug gapping tool and gap the plug to your car's specification. The gap is properly adjusted when there's the slightest drag on the gapping tool as you slide it between the two electrodes.

5. At this point, you can test each plug on the testing portion of the cleaning-testing machine. But be aware of this point stressed by plug manufacturers:

Many perfectly good spark plugs with thousands of miles of service yet to be utilized are scrapped due to misinterpretation of the information obtained from a pressure-type tester.

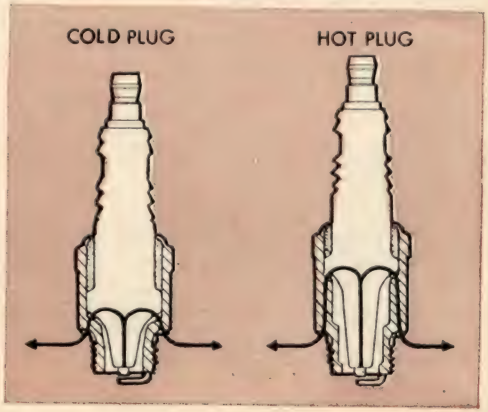
This misunderstanding comes about because of the differences between conditions in the tester and actual conditions in the engine. The tester, for example, operates on the principle of increasing air pressure in the testing chamber until a spark no longer occurs between the electrodes. The air pressure in the tester is usually at room temperature, while spark plugs operate in an engine at temperatures ranging from 300°F. at idle speed to 1700°F. with the throttle wide open.

To get a true reading from the tester, use the following procedure, but keep in mind that when all is said and done, the best and final test is how those plugs operate when in use on the road:

- Make sure the plug electrodes have

(Please turn to page 224)

HOT AND COLD PLUGS differ in how fast they dissipate heat of combustion (arrows). Hot plug runs hotter merely because the heat has longer distance to go



AUTO CLINIC

Q Below zero weather causes my 1960 Ford with 352 CID engine to fire on one cylinder when starting and then kick the starter drive out. I've had it tuned up, but it hasn't helped. What will?—L.M., Mich.

A I'd look to the condition of the distributor cap and spark plug wires. The trouble may be caused by cross-firing either in the distributor cap or from one plug wire to another. Check for carbon tracks in the cap first. If any are found, get a new cap. If no carbon tracks, test each plug wire with an ohmmeter. Resistance in each wire should not exceed 24,000 ohms. After making tests and any needed repairs, set engine timing to specification. If this doesn't solve the problem, you'll have to remove the starter and check for a worn drive gear or defective drive clutch in the starter drive.

Q When I use the headlights and heater on my 1961 Chevrolet at the same time and the engine is running at normal speed, the battery "idiot light" shows a faint glow. However, with these accessories on and at idle speed, there is no glow. Generator and regulator check out OK. Is it anything to be worried about?—J.P.M., Ill.

A No. As a matter of fact, it's a common occurrence. At driving speed with lights and accessories turned on, a great amount of current is being generated by the generator. A little of this current is being fed back from the generator into the ammeter. At idle speed, current output is reduced and there's no feedback—hence, no glow. Some Chevy owners tell us that they got rid of the glow by changing bulbs in the "idiot lights." Newer bulbs probably have a greater resistance to the feedback current. Really, though, it's not necessary to switch bulbs since the faint glow doesn't mean electrical trouble.

Q There's a sort of crunch or creaking noise in the front suspension of my 1962 Meteor that occurs when I apply the brakes to stop in either a forward or reverse speed. Have you heard of this?—J.P.S., Kansas

A Yes, and it could occur as well with the 1961 Meteor and all Comets from 1961 through 1964. The cause of the problem is insufficient lubricant in the front suspension upper arm inner shaft bushings. The solution is to lubricate these bushings, which involves a lengthy procedure including some grinding of the bushings themselves. The way to do the job is outlined in Lincoln-Mercury Service Bulletin 48 (6/26/64).

Q Whenever I make a sharp left turn with my 1962 Oldsmobile 88, the car stalls. Why?—M.A.A., Colo.

A There are two likely reasons. First, the carburetor float might not be adjusted properly, which causes the carburetor to get a load of gas on a sharp turn. Flooding like this will cause a stall. Secondly, there's a baffle on the float chamber of your Olds carburetor. If you've had the carburetor taken off recently for cleaning or repair, perhaps the baffle wasn't reinstalled or wasn't tightened enough, which would also cause a flooding condition, particularly on left turns when the gas level is tipped.

Q I have a 1961 Volkswagen with 35,000 miles on it that's developed a loud engine noise. I've been told it's the camshaft. Could it be?—R.J.K., N.H.

A I think the camshaft is a sound theory since VW's with that much mileage have been known to develop this type of trouble. However, before ripping into the shaft I'd check for a loose rocker arm and a bent or broken push rod—either of which might cause engine noise, and which are a lot less expensive to repair. If checks indicate that the camshaft's at fault, you'll have to replace the cams and followers, and recondition the rocker assembly. I'd also consider changing the clutch pressure plate at the same time since this part, too, often goes bad around the 35,000 mile mark.

Q As you know, the starter on the 1959 Buick LaSabre is on the gas pedal. When I turn on the ignition key, the starter often revs before I get my foot on the pedal. Other times, it won't start the

engine, but just hums, and I have to turn off the ignition, wait, and try to start it again. It often takes quite a few tries. What's up?—E.J.A., Maine

A There's a vacuum switch on the carburetor that controls the starting of this car. When it gets clogged with dirt or shorts out, it'll cause this exact condition. I'd replace it.

Q **Ever since doing engine work on my 1963 Austin, I've had a peculiar situation. The engine keeps running after I shut off the ignition, and to stop it I have to put the transmission in gear. It seems to be happening only on one cylinder. What do you think?—K.M., Ill.**

A Most likely in doing that engine work the head was removed. If so, there's a good chance that the head gasket wasn't refitted properly. It might be overlapping right into the cylinders, especially that one you mentioned. If this doesn't prove out, then I'd get mighty suspicious of the carburetor. This trouble has been known to happen on the Austin when the carburetor runs too rich. I'd check the fuel-air ratio and make necessary adjustments.

Q **What would cause a 1957 Dodge V8 with a 12-volt electrical system to burn a set of points every 2000 miles? —F.H., Minn.**

A The main reason for this in any car with a 12-volt electrical system, not only the Dodge, centers around the resistor on the coil. If it's "opened," then too much current will flow to the distributor and hit the points, burning them quickly. It's also possible that, if the car's been worked on, someone failed to tie all current-carrying wires going to the distributor into this resistor. This is all assuming of course, that the generator and voltage regulator are in good condition. If the generator is generating too much or if the voltage limiter is malfunctioning, it's also possible to get too much current to the points. I'd replace the resistor first, make sure all wires to the distributor are tied in and, failing this, give the charging system a test with a volt-ammeter. By the way, are you certain that those points are being adjusted to specification?

Monthly Service Tips

★ There have been reports of gas fumes in the trunks of 1964 Comets. The trouble's been traced to loose fuel filler hose clamps, and it's spelled out in Service Bulletin 55 (Aug. 14, 1964). Cure for the problem is to have your Mercury dealer remove the two present clamps and replace them with two new ones carrying part number 8A-8287.

★ Hot tip for owners of Dodges with the 426 Hemi-Charger engine: Cylinder head bolt torque is critical on this engine. In order to get proper cylinder head gasket compression, Lubri-plate has to be applied to the bolt threads and between the bolt head and hardened washer. The bolts then have to be torqued to 75 foot pounds. The man doing the job has to make sure he doesn't get any of the Lubri-plate between the hardened washer and bolt boss, since this can result in excessive bolt tension and could cause head bolts to break. If you haven't had this job done, you'd best get the car back to your dealer. The "news flash" came from Dodge on July 7, 1964.

★ If you have an overheating problem in a 1964 Mercury with air conditioning, get the car back to your dealer pronto. It's probably being caused by a fan spacer that's too short. The new, longer one is part number C4AZ-8546-B.

★ If you car's equipped with a window-type distributor cap (for ease of adjustment) make absolutely sure that this window is closed after the car's been worked on. In many cases, the window drops down of its own weight after the adjustment tool is removed. But if it's accidentally left open, dusty air can enter the distributor and cause pitting of points.

As a service to Popular Mechanics readers with problems relating to their cars or to driving in general, we invite you to submit your questions for answering through this column or by mail. Address Auto Clinic, Popular Mechanics Magazine, 575 Lexington Avenue, New York, N. Y. 10022, enclosing a stamped, self-addressed envelope.

SABRE SAW COMPRESSOR

By Howard W. Teter

IF YOU OWN a sabre saw, you can put it to work driving this potent little air compressor. In spite of its small size and short stroke, its performance is amazing. It easily develops more than 50 lbs. pressure, and because of its high operating speed (upwards of 3000 strokes per minute) it delivers plenty of volume to supply a bleeder-type spray gun. It's adaptable to any sabre saw of ½- to 1-inch stroke, except models having orbital blade motion.

Materials to make the compressor will cost about $2. The body, which is a cylinder and surge chamber to even out pulsations, is made from a slip-joint trap extension, a common item at most plumbing supply shops. The extension should be 1½-in. in diameter and must have a threaded portion and nut on the large end.

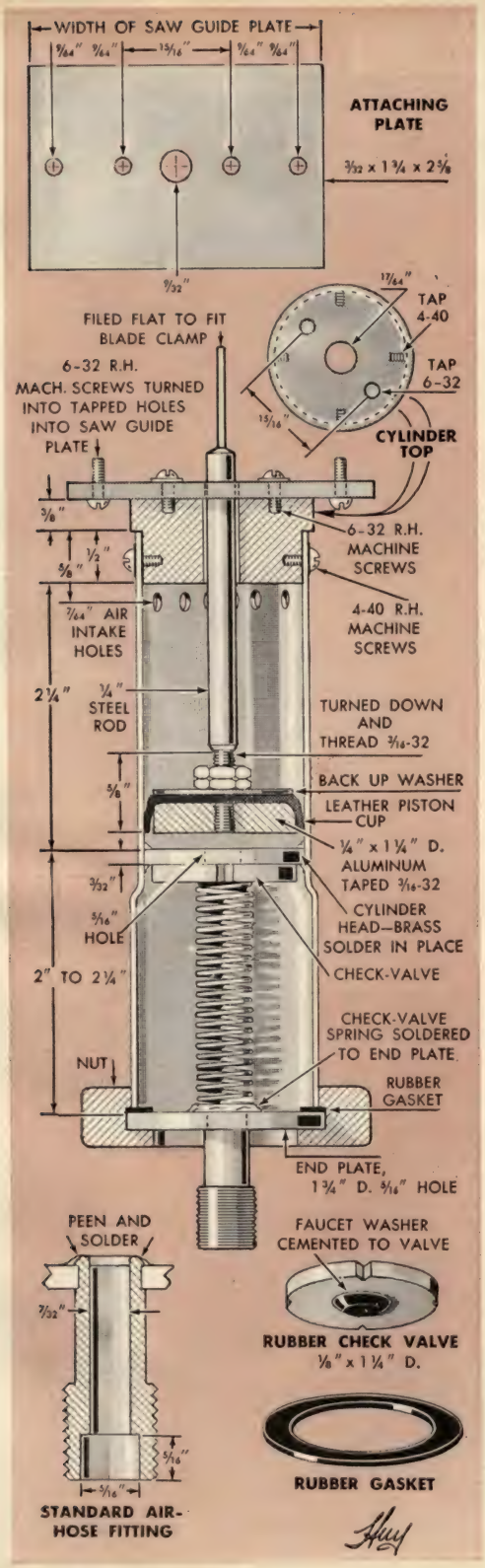
Put the extension in a lathe and cut off a section to the proper dimension. It's best to remove the chrome plating with emery cloth while the piece is still in the lathe. This will greatly improve heat emission.

The cylinder head, which is also the check-valve seat, and the surge chamber end plate are turned from flat brass about 3/32-in. thick. To hold the cylinder head in proper position (⅛ in. above the flare) while soldering, cut a block of wood to fit loosely inside the tubing and set the block upright on the bench with the disc on top. Then flux the edge of the disc and slip the larger end of the tubing down over it. Apply a torch flame to the outside, taking care to avoid leaving bits of solder on the cylinder wall.

The check valve is cut from a flat piece of rubber taken from a truck inner tube. A few notches around the edge will insure free air flow. The valve spring is kept centered by a ¼-in. faucet washer contact-cemented to the middle of the check valve. A suitable spring can be obtained from a discarded window-shade roller. Cut off a 20-turn length and stretch it until it is 3-in. long when released. The top end fits snugly on the faucet washer.

A drilled and tapped space filler, preferably aluminum or other light metal, fits inside the leather piston cup to displace air that would otherwise be trapped there. Make the piston rod from a ¼-in. carriage bolt, 5-in. long. Since saws vary, its exact length will have to be determined by trial fitting. When the saw's ram is at bottom dead center, the piston should almost touch the cylinder head.

When assembling the piston, work a generous amount of machine oil into the leather to soften it. Blot off any excess, then oil the cylinder wall lightly before inserting the piston. After several hours of use, more oil can be worked into the leather, but too heavy an application may contaminate the air stream. ★★★

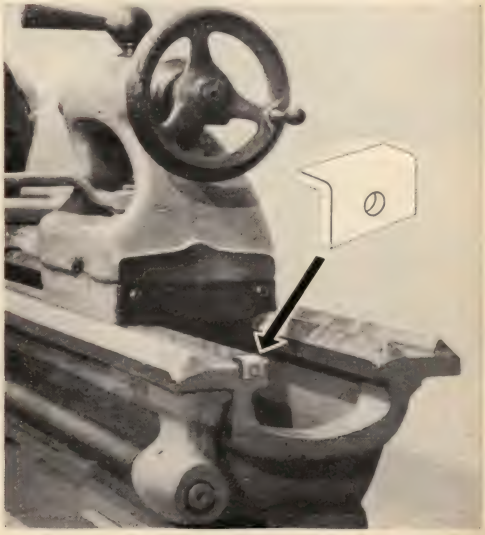


Long Arm Simplifies Loading

Tipping bulky crates onto a handtruck was always a two-man job until one shipping department provided its workers with "grappling" hooks bent and welded from 3/8-in. rod. Now one man can easily reach over and pull the crate onto the truck without assistance. A handle, cushioned with a piece of garden hose, was formed on the hook as shown.—*Robert J. Phillip*

Safety Stop for Tailstock

The tailstock on your lathe would cost a pretty penny to replace. To avoid accidentally shoving it off the ways take time to add this simple stop. Bend it from 1/8-in. mild steel and drill it to fit a hole drilled and tapped in the bed.—*Henry Sevcik*



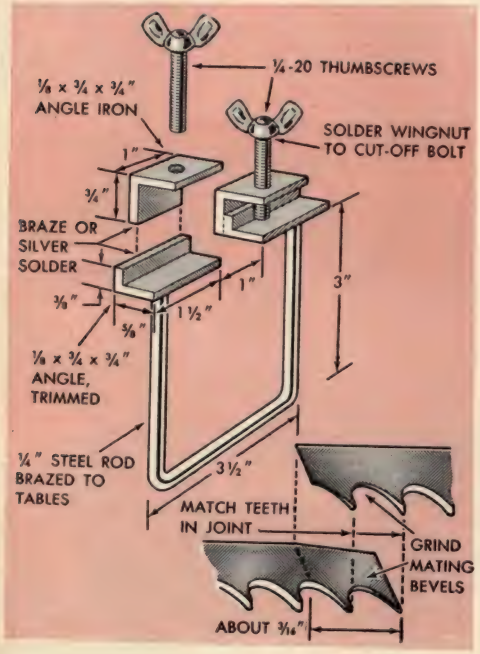
BRAZING FIXTURE
FOR BANDSAW BLADES

YOU CAN SAVE up to half on blade costs if you buy bulk 100-ft. rolls and make up your own bandsaw blades—either wood- or metal-cutting. But you have to know how to silver-solder the joints.

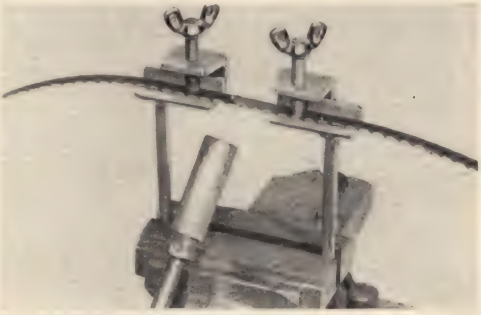
This technique is easily mastered, if you make the simple clamping fixture detailed below. And silver-soldering has an advantage over fusion-welding: The joint can be taken apart by heating, to pass the blade through pierced work, then re-soldered.

To make the fixture, cut a 3-in. and a 4-in. length of steel angle, trim one leg of the latter as shown, then center and braze the shorter length to it. After brazing on the U-shaped rod, cut a 1-in. segment from the middle of the angles. This assures that both tables will be in the same plane.

A silver-soldered butt joint won't hold; you must overlap the ends with mating bevels. The four steps in brazing are shown at right. You apply heat from below to keep the flame from blowing the flux away as it dries. If the solder balls in the first step, you used too little flux and should file the bevel bright before re-fluxing. Once the upper blade-end springs down against the lower one, you swing the torch to heat from the top until the upper end glows red and the solder melts again. The asbestos wrap on the clothespin assures slow cooling.—*Manly Banister*



CLAMP BLADE outer face up, apply flux to bevel and heat from beneath till solder flows, coating it

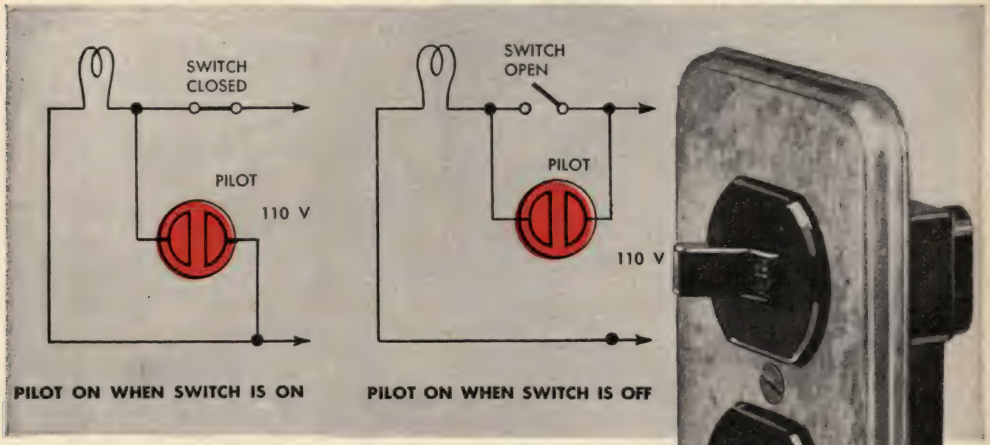


LOOSEN CLAMP on right and bring other bevel in to overlap. Heat till solder melts and bevels join

WHILE PLAYING flame on joint from above, clamp on asbestos-jawed clothespin, remove flame, let cool

GRIND EXCESS silver squeezed out of joint on both faces. Use three-cornered file to clean gullets

Bright Ideas for the Amateur Electrician

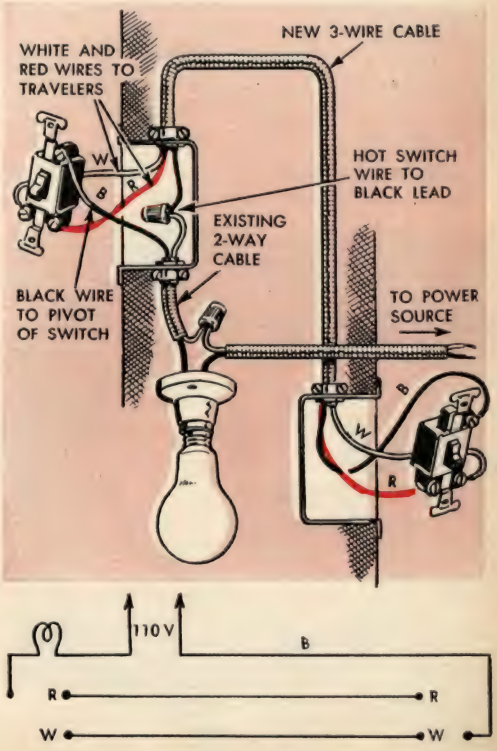


YOU NO LONGER NEED TO GROPE for a light switch when you come in at night—a new combination switch-and-pilot makes it easy for you to spot the switch at a glance since it can be wired to make the pilot glow when the switch is off. This convenient one-piece product by General Electric also can be wired in the normal manner to serve as a telltale warning light for important circuits that control a food freezer, heating plant or other critical appliance. It fits any standard Gem box and duplex receptacle plate. The diagrams show the two different ways to wire it.—*Joseph Braunstein*

ONE LIGHT SWITCH per stairway is a nuisance and a hazard. If the switch is at the top of the stairs, you can't turn the light off after you walk down. If it's at the bottom of the stairs, you may take a spill walking down in the dark to turn it on. The solution, of course, is a switch at each location—and adding another one is something you can do yourself.

First cut a hole in the wall for a common Gem box. Then remove the fuse controlling the circuit and take out the old 2-way switch at the top of the stairs. Next run a 3-wire (#12 or 14 ga.) BX cable from one switch opening to the other, and replace the fuse. Now with a test lamp determine which wire of the circuit is hot. Again remove the fuse and splice the hot wire to the black wire of the 3-wire cable with a solderless connector.

Your new switches have to be the 3-way type and you will find that each one has three terminals. One, which is bronze, is called the pivot, the other two, which are brass, are called the travellers. The second wire of the circuit is connected to the pivot terminal. The red and white wires of the 3-wire cable are connected to respective traveller terminals of each switch. Finally, fasten the switches in their boxes, add the plates, replace the fuse.—*Sam Julty*



Heavy Duty Shop Vacuum Cleaner

By Harold P. Strand

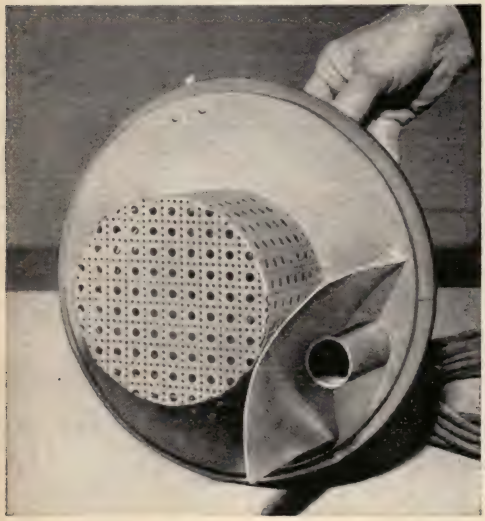
ALL YOU NEED to build this efficient shop vacuum cleaner is the motor-blower unit from an old, upright household vacuum cleaner, an empty five-gallon grease can and a few odds and ends found around most shops. The cost will run well below what you'd pay for an equivalent commercial unit.

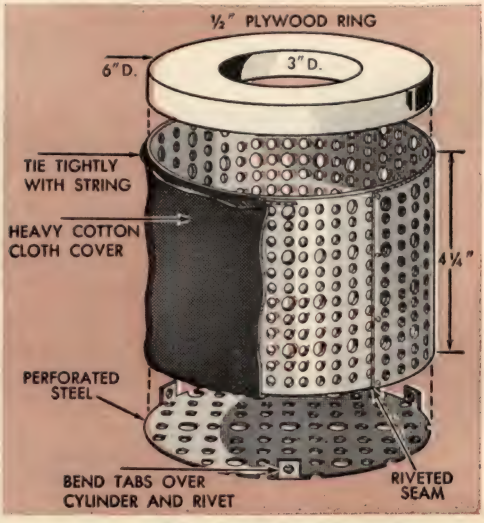
I built this unit from an old upright Universal which had been relegated to the attic. However, almost any similar type household vacuum cleaner can be used, as long as you modify the plans to accommodate differences in size and shape.

If you have to buy an old machine, it should run you about $5 to $10 at a second-hand store or vacuum-cleaner repair shop. Before buying one, turn it on and make sure there's very little arcing at the brushes.

Sometimes you can rejuvenate the motor sufficiently by disassembling it, cleaning

CYLINDRICAL FILTER, consisting of a perforated metal screen and a cloth bag, fits over suction port of the blower to protect mechanism from dust, debris. Sheetmetal baffle "throws" debris to bottom of canister





it thoroughly, smoothing the commutator with fine sandpaper, installing new carbon brushes and replacing worn out bearings. If the cord is worn or otherwise deteriorated, it's a good idea to replace it with a new rubber-covered one made specifically for use on vacuum cleaners.

Strip Down the Old Cleaner

Your first step is to strip down the old cleaner to the motor housing and blower. If it's a Universal, make up a small housing from sheet metal to enclose the space between the two lugs to which the handle attaches (see drawing, page 193). On this housing, install a toggle switch and a grommet for the line cord. The two leads from the motor also enter this enclosure for connecting to the line cord and switch. With other make cleaners, you can locate the switch on the canister cover, or where the line cord enters directly into the motor through a grommet, a cord switch can be spliced in quite easily.

The grease can used for the canister should be well cleaned with a solvent, then washed with hot water and detergent. Remove the handle and apply primer inside and out. After drying, apply a coat of gray enamel or other suitable finish.

The base for the can consists of two plywood discs. One should fit in the can's recess, where it is secured with screws driven in from the edge. The other is made larger and is attached to the top disc with glue and screws. Installing four casters completes work on this section.

The canister cover is also made of two plywood discs laminated together with glue and screws. However, it has a center opening which is cut to fit the suction port of the vacuum-cleaner blower, which projects from the Universal when the front hood is removed. With some other makes, the dust-collecting front hood may be a part of the general blower housing and therefore not removable. In that case, you'll have to cut this part off with a hacksaw before proceeding.

Mount Machinery on Cover

The motor-blower unit is attached to the cover with three small brackets and screws. A gasket cut from an old inner tube assures a tight seal.

A hole must also be made in the cover for press-fit mounting of the new suction intake, which is the short length of tube to which the vacuum-cleaner hose will be attached (see drawing, page 192). If you can't find a tube of the right diameter, make one by rolling up a piece of 26-ga. galvanized sheet steel and soldering the seam, taking care to get it perfectly round by forming it on a piece of pipe.

ASSURE EFFICIENT OPERATION by emptying canister periodically and brushing off the cloth filter bag

CLOTH BAG that covers blower-intake filter should be of closely woven cotton or other material that will "trap" dust particles. Tie on with double string

TOP VIEW shows layout of the mechanical parts on top cover. Note hook at top to hold cord when machine is idle. Handles are stock drawer pulls

Two handles on the canister cover will facilitate emptying, and a strip of rubber or felt cemented to the underside of the cover makes an effective gasket. Two suitcase latches attached to the canister will hold the cover down tightly. The hooks which engage the loops of the latches were made from $\frac{3}{32}$-in. soft steel. The cover should be painted before installing any of the above parts.

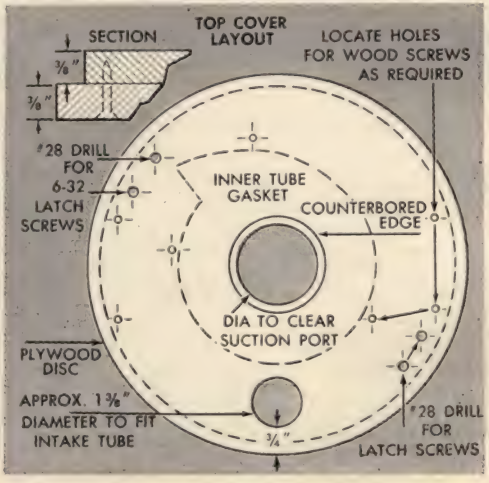
Now you must make a filter to protect the suction port of the blower. Cut out a plywood ring and attach this to the underside of the cover, under the center opening. Then make a cylindrical screen from perforated metal such as radiator enclosure grille or hardware cloth. Fasten the filter to the plywood ring with screws. To complete the filter, add a draw-string cover made from a close-weave cotton or similar material.

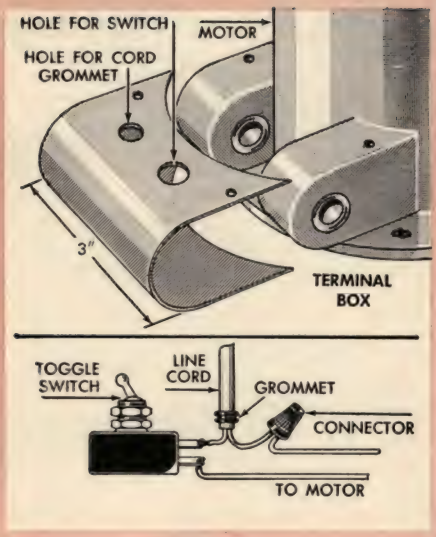
Protects Filter

Next, install a curved baffle of sheet metal between the filter and the suction intake tube to deflect incoming shavings and chips from the filter and direct them to the bottom of the canister.

Now all you need to get maximum use out of your shop vacuum cleaner is the hose, a long nozzle, a small round brush attachment and an extension tube. These may be taken from the original household cleaner, or purchased from a dealer who carries replacement parts. Fit the hose to the suction intake tube, securing it with a hose clamp or a length of wide flexible plastic tape.

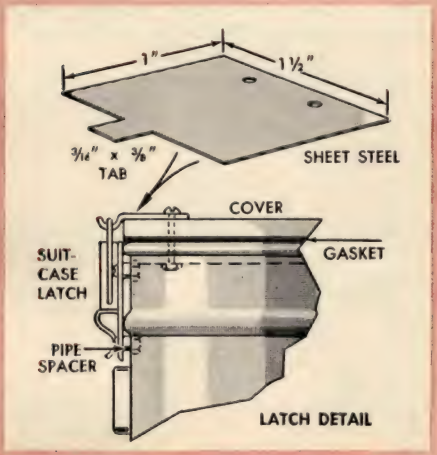
When operating the vacuum, follow the same common-sense rules that apply to any such machine, whether shop or household type. Empty the canister regularly, and brush off the filter. Also, to avoid clogging, do not try to pick up any object

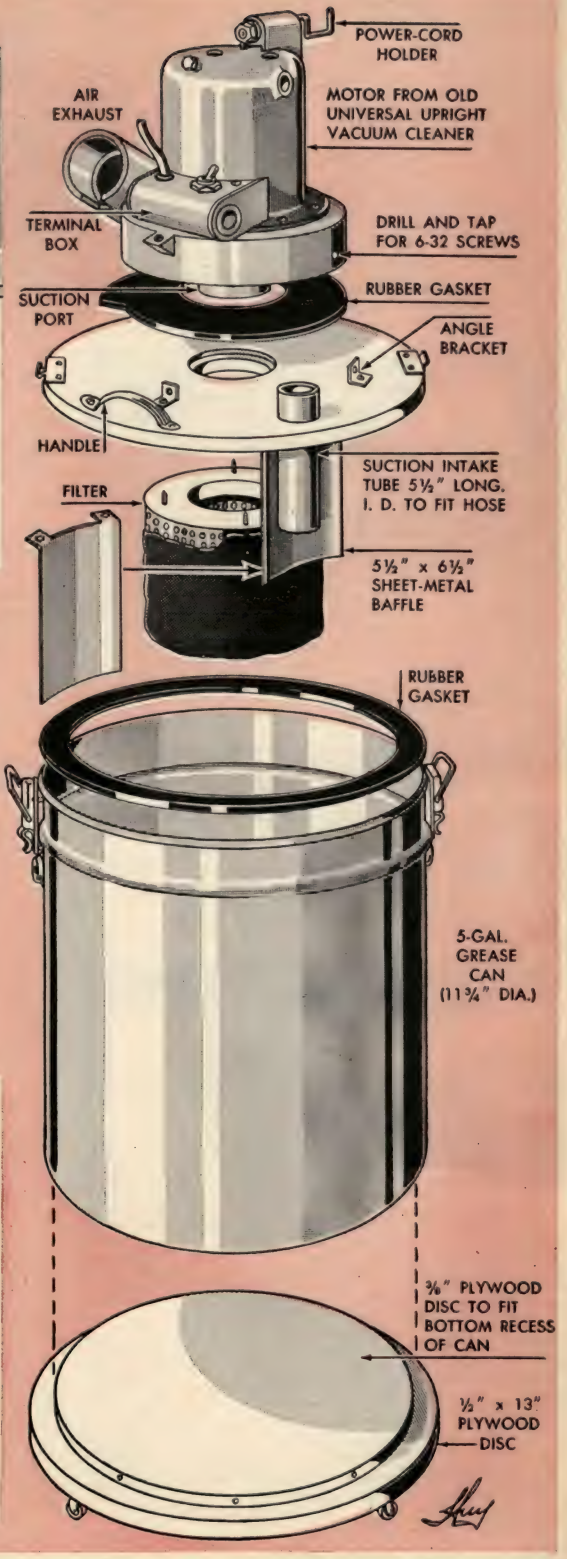


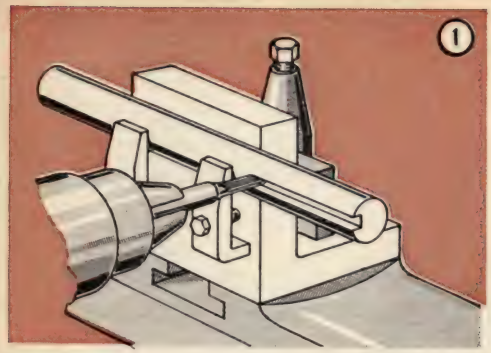


such as a large scrap of wood that won't pass easily through the hose. Also, it might be best to stay away from large nuts, bolts and metal scraps, which might damage the baffle.

Incidentally, it's important to keep the bearings of the vacuum-cleaner motor well lubricated, via the grease cups at each end of the motor. Since the motor is now operating in a vertical position, there is some downward thrust on the lower bearing due to the weight of the armature fan, which will place some extra wear on this bearing if allowed to run dry. ★★★



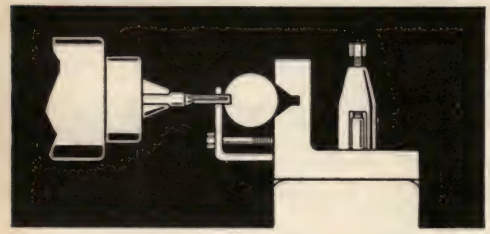




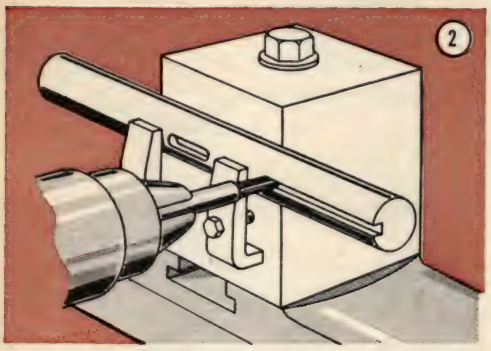
MILL KEYWAYS In Your Lathe

DOES YOUR machine shop consist of a lathe—*period*? No matter: you can teach this one tool to perform nearly all machining operations. As a start, try cutting keyways in shafts of various diameters.

You can hold straight-shank end mills in a collet or chuck, or in a taper-shank adapter inserted directly into the hollow headstock spindle. The only accessory you have to make is a sturdy clamping fixture you mount on the compound rest to position the work. The precision controls of the carriage and cross-feed screws let you move the work into the cutter and draw it past, as well. This means you can cut both open-end keyways and blind slots.

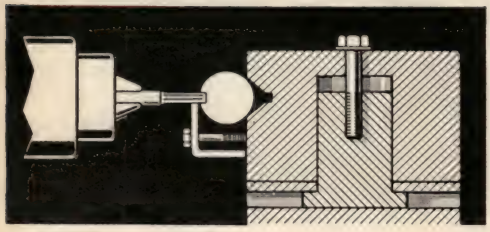


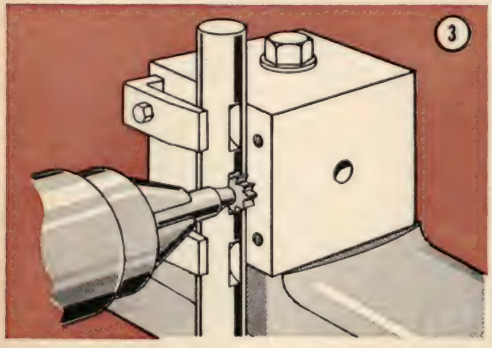
One such clamping fixture can be made of heavy angle (Fig. 1) bored to take the toolpost and clamped to the rest by means of a steel bar slipped into the toolpost slot. After it's in place, mill a V-groove across its face (as shown in the cross section) by mounting an angular cutter in the headstock and drawing the work past it with the cross-slide feed screw. The groove thus formed lets you clamp the work in an accurate horizontal plane at lathe-center.

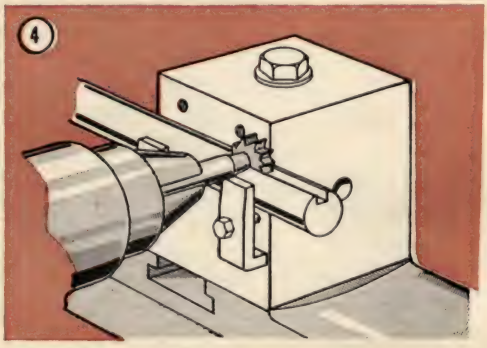


An alternate fixture (Fig. 2) is a steel block bored to receive a flanged post (like the lower end of the toolpost) so you can clamp it to the compound rest's T-slot with a large capscrew.

Figs. 3 and 4 show set-ups with a Woodruff keyway cutter in the headstock; the cut, in such a case, is made at right angles to the spindle. Woodruff keyseats are made by clamping the work in a vertical position and feeding it into the whirling cutter. Again, if you mill an accurate V-groove across the block, you can position the work quickly.—*C. W. Woodson*





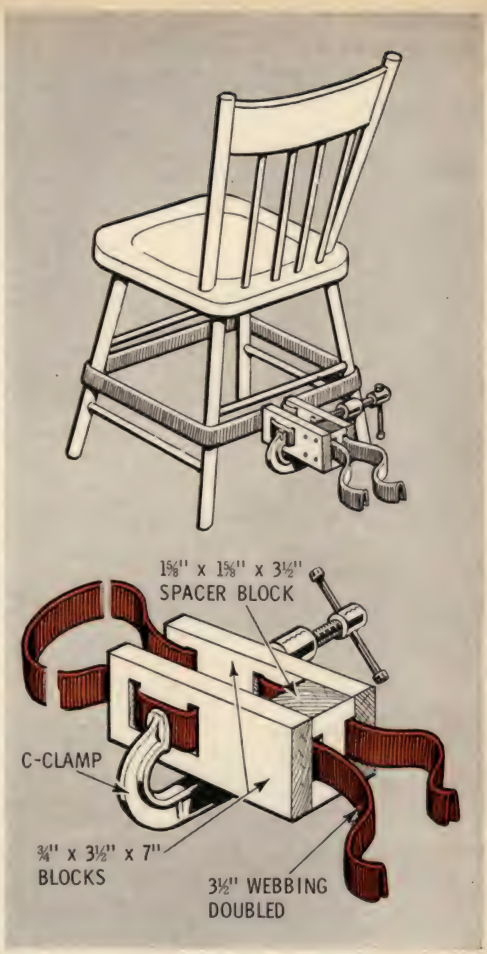


C-Clamp Tightens Band Clamp

With some upholstery webbing, a C-clamp and three pieces of ¾-in. stock, you can make a very workable band clamp for gluing up round or irregular objects. Cut and notch the wood parts as detailed at right, then fasten the spacer block to *only one* of the side pieces with glue and 1½-in. No. 6 F.H. screws.

The 3½-in. webbing, which is folded into a double thickness 1¾ in. wide, is readily obtainable at upholstery shops for about 20¢ a yard. Three yards should be enough for most jobs.

To use the clamp, thread the ends of the webbing through the double slots in the side pieces as shown and out through the slots in the spacer block. Pass the loop around the work and pull the strap ends hand tight. Then apply a C-clamp so it will grip the band on either side. Tightening the C-clamp exerts pull on the webbing band and gives necessary tension. Although there is very little stretch in upholstery webbing, check the band after an hour or so. If any slack has occurred, another turn of the C-clamp will take it up.—*Hayden Ricker*



To simplify painting of jewelry and other small items that are too small to hold readily in your hand, stick the items on a piece of masking tape. The tape will hold them securely for painting with a small brush, and may be left on the tape while drying. The tape can be used repeatedly for this purpose. —*Ken Murray*

NEXT MONTH IN SHOP AND CRAFTS

★ **8-FT. HYDROPLANE.** Any boat that can skim over the water at a sizzling 33 m.p.h. when pushed by a little 14-hp. outboard is a bargain in the power department. But when the build-it-yourself price tag is only $25, it becomes a bang-up bargain in all departments. You'll find detailed plans for this one-man speedster in the March issue of *PM* so don't miss it

★ **CAULKING THAT LASTS THE LIFE OF YOUR HOUSE.** They don't shrink or crack. They adhere to most any material. They resist ultra-violet radiation and remain flexible from −65 deg. F. to 250 deg. F. These are just a few of the startling characteristics of polysulfide sealants. If you're interested in finding out more about these amazing synthetic rubber caulking materials, be sure to get the next issue of *PM*. It has all the facts

★ **HOW TO KEEP YOUR WHEELS FROM COMING OFF.** Proper wheel maintenance involves more than just making sure that the lugs are turned up tight. Neglect it and one day while speeding down the highway you may suddenly find yourself frantically trying to control a three-wheeled car. For a step-by-step guide to wheel maintenance, check the March issue

★ **DOVETAILING JIGS FOR YOUR ROUTER.** All you furniture makers will be interested in this one. Once you've made this set of template jigs, you'll be able to cut fast and accurate open and half-blind dovetail joints in (what else?) jig time. You'll find full plans for making the jigs plus easy instructions on how to use them in the next issue of *PM*

Life-Saver in Your

Pocket-sized blinker will warn off traffic should you break down on the highway. Build it for only $4

By Fred Blechman

WHAT A TIME for a flat tire! Night, on a dark road in the middle of nowhere.

The problem is not in changing the tire, but in avoiding being hit by an approaching car whose driver doesn't see your disabled vehicle. Leaving your parking lights on is one solution, but this imposes a fairly heavy drain on the car battery, and these lights don't command attention if there's much other lighting in the area.

Another possibility is to use a dry-cell battery powered flasher. But very often the batteries in these units are dead at the moment you need them most.

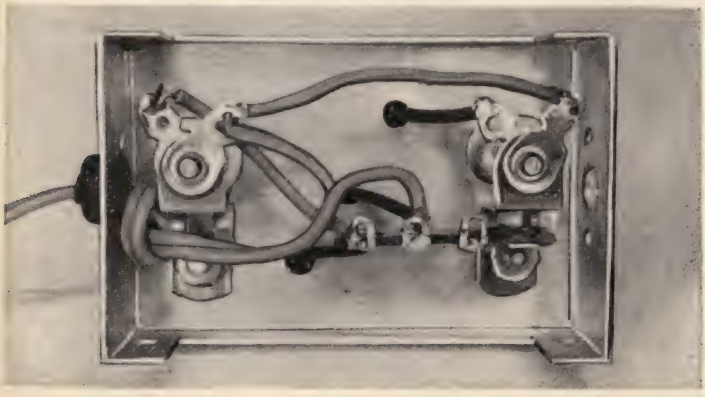
A better solution is to build the compact warning blinker described here. It plugs into the automobile cigarette lighter socket for power, provides two alternately blinking lights and takes up almost no storage space.

With about $4 cash and one hour's labor (probably less), you can have your own.

Construction is kept as uncomplicated as possible by using a preassembled transistorized flasher module. In all, there are only three electronic parts to interconnect.

BLINKER is small enough to put almost anywhere. You'll probably want to keep it at eye level or higher so it can be seen easily. Add a magnet to the case, and you can just stick it in place the next time you have to change a tire

WIRING is kept as uncomplicated as possible. As an additional help, you don't have to worry about the placement of leads inside the case. If desired you can solder the lamps into the circuit and avoid using sockets



Glove Compartment

All parts are mounted in a small 3¼ x 2⅛ x 1⅛-inch box. If you use the aluminum case listed, be sure that none of the wiring contacts the case.

For my unit I drilled three holes in the face of the case for the module leads and cemented the module to the front of the case again making sure that these leads did not touch the case.

If you intend to use the unit with a car that has a 12-volt electrical system, use No. 57 or 1815 bulbs. For 6-volt systems use No. 55 or 47 bulbs. Be sure to wire the cigarette lighter plug (available at most auto parts stores) with the proper polarity, the hot side to the center prong and the ground to the remaining contact.

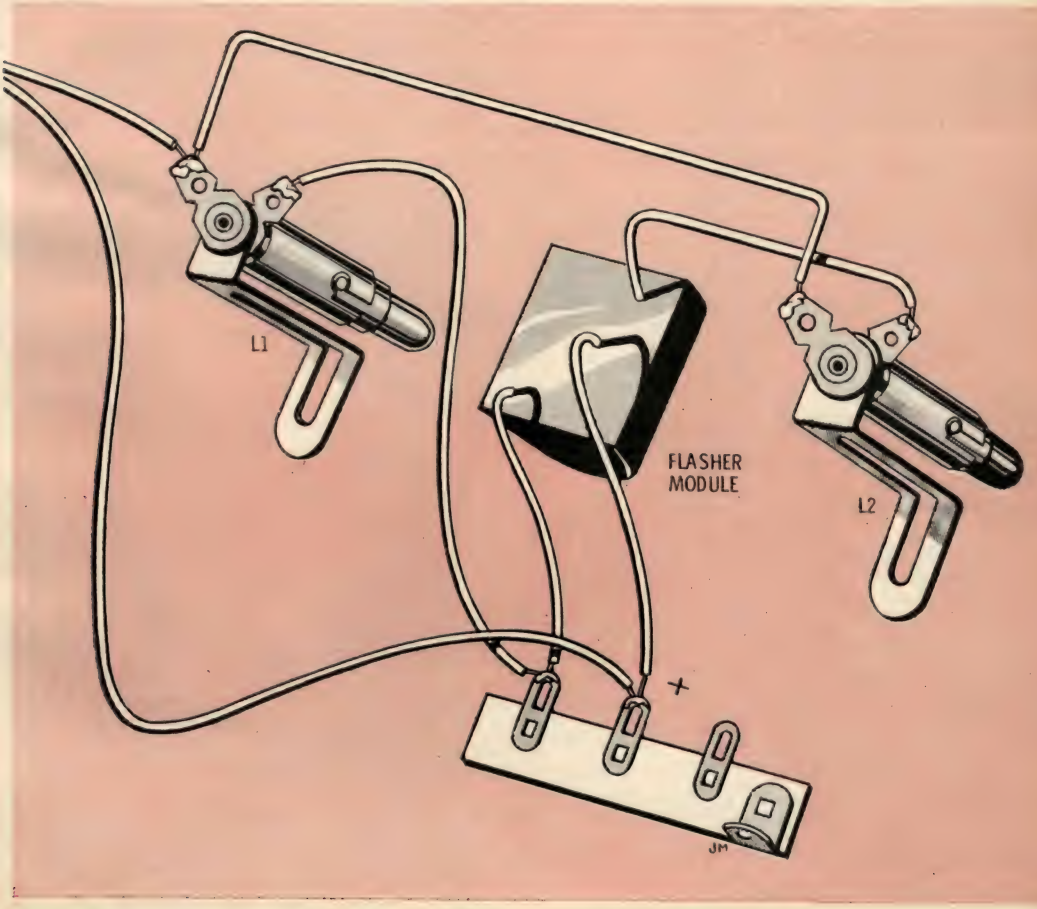
The cord that connects the plug to the flasher is ordinary lamp cord and can be made any length. Normally about 10 feet is enough. As a final touch, coat the bulbs with a light layer of red nail polish.

Chances are you'll never have to use this flasher. But you'll appreciate it should it ever become needed.

PARTS LIST

Flasher Module (Lafayette SP-296 or equivalent)
Cigarette Lighter Plug (see text)
L1, L2—6 volts: No. 55 or 47
12 volts: No. 57 or 1815
Pilot Light Sockets (2) (Dialco No. 705 or equivalent)
Case, 3¼ x 2⅛ x 1⅛ (Bud 3017A or equivalent)
Lamp cord, terminal strips, cement, miscellaneous hardware

LARGE-SCALE PICTORIAL diagram shows complete wiring in detail. The only connection to the flasher module that must be made where it's shown is the middle lead. The other two can be reversed, and the unit will still work



COLD Sounds the Alarm

Heating plant quit? This $5 low-temperature alarm will warn you quickly before the house gets cold

By Harold Strand

THIS SIMPLE ELECTRONIC ALARM can be invaluable as a warning that the temperature in your home has fallen below set limits of the regular thermostat controlling the heating system.

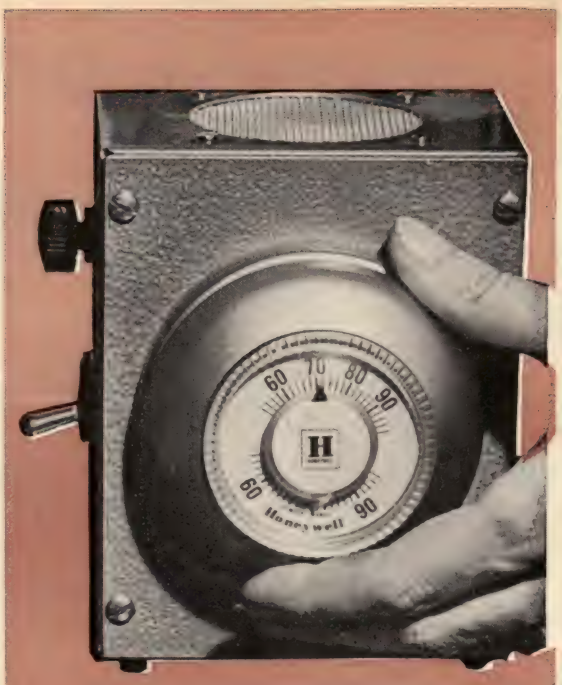
The temperature drop could be caused by a power failure or trouble in the heating plant. It could happen at night, causing frozen or burst water pipes plus the discomfort of waking up to an ice-cold house. It would be especially important should there be an ill child in the house.

A thermostat mounted on the front panel of the low-temperature alarm triggers the device. If for any reason temperature in your home should drop, the thermostat is activated and the alarm goes off. Keep the alarm set five degrees lower than the thermostat for your heating unit. This will give ample warning.

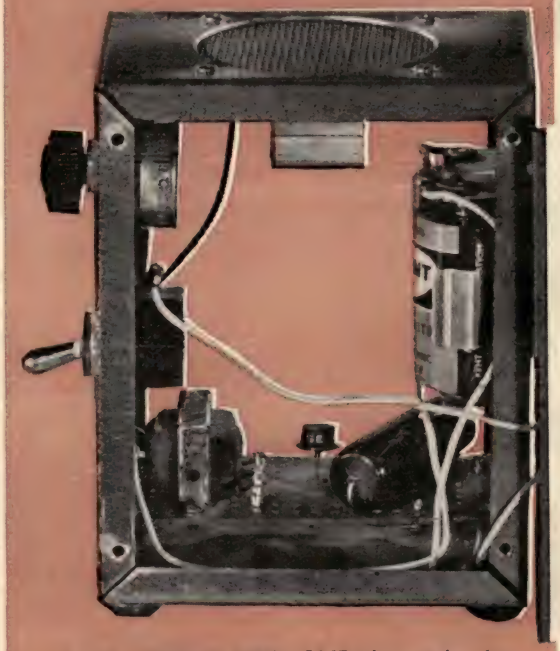
The unit consists of an audio oscillator operating at about 400 cycles. When triggered by the built-in thermostat the oscillator output is fed to a small speaker. The resulting tone is quite penetrating and sure to wake almost any sleeper. It can be set to a suitable volume level.

Wiring is fully detailed in the pictorial diagram. Work slowly and solder carefully. Do not insert the transistor into its socket until all wiring has been completed. Make sure battery polarity is correct before trying the unit the first time.

You can test the completed alarm in several ways, but the simplest is to set the alarm thermostat to a temperature higher than that in the house. Immediately, the thermostat contacts should close and the alarm sound off. Now lower the alarm thermostat setting, and the signal tone should stop as soon as you get below the room temperature. One last hint: Keep the alarm level on a flat surface or it will not operate properly because of the mercury switch in the thermostat.



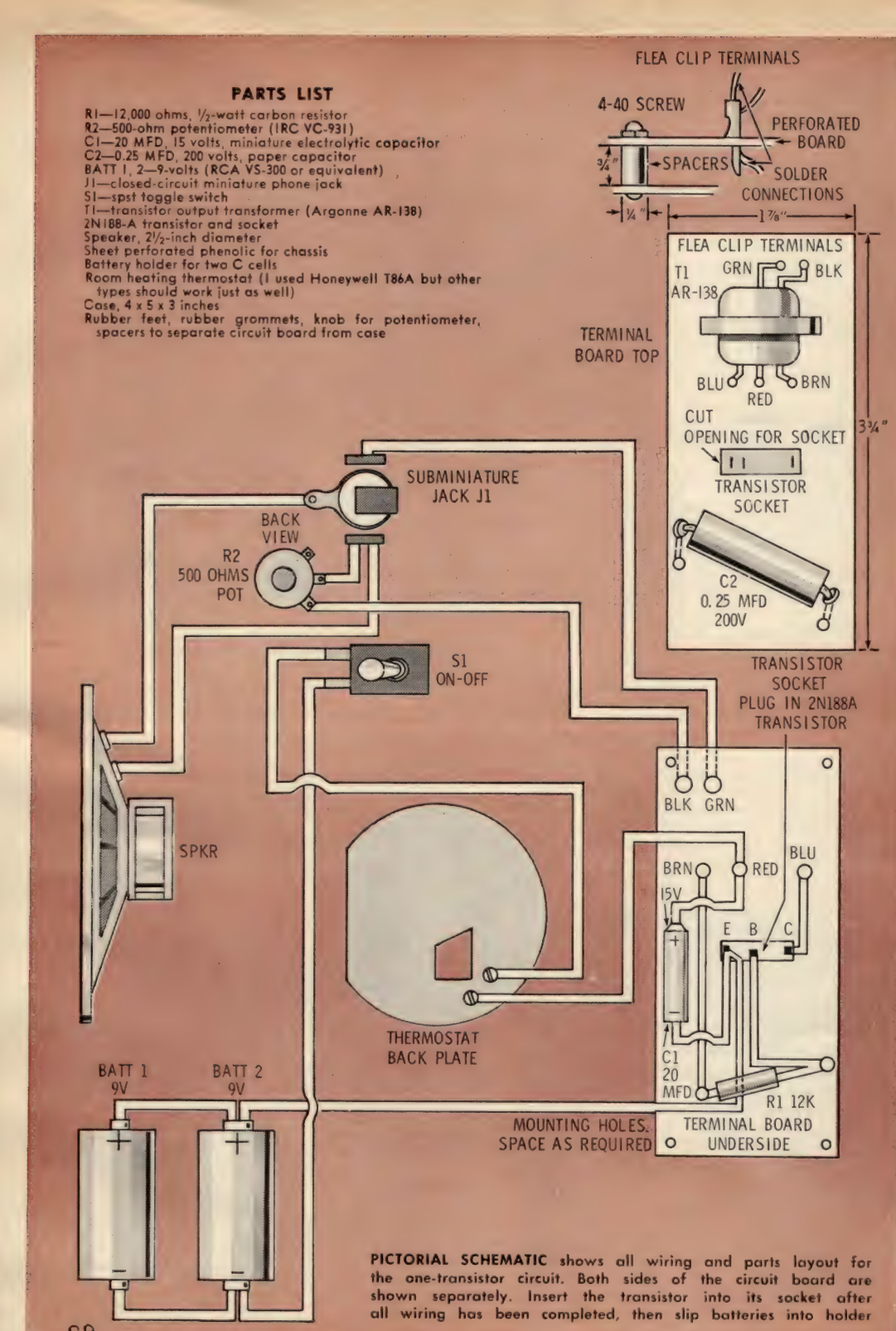
SET THE ALARM by adjusting alarm thermostat five degrees lower than the heating plant thermostat. If temperature drops, the alarm sounds off



IN THE COMPACT METAL CASE, the speaker is mounted to the top, the perforated circuit board to the bottom and two controls come out the side

PARTS LIST

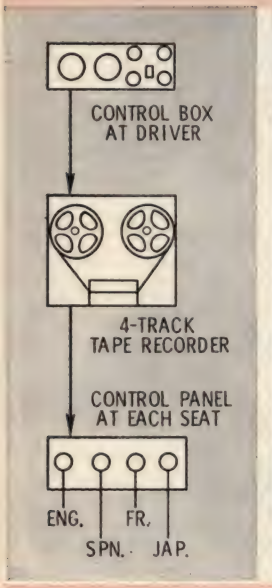
R1—12,000 ohms, ½-watt carbon resistor
R2—500-ohm potentiometer (IRC VC-931)
C1—20 MFD, 15 volts, miniature electrolytic capacitor
C2—0.25 MFD, 200 volts, paper capacitor
BATT 1, 2—9-volts (RCA VS-300 or equivalent)
J1—closed-circuit miniature phone jack
S1—spst toggle switch
T1—transistor output transformer (Argonne AR-138)
2N188-A transistor and socket
Speaker, 2½-inch diameter
Sheet perforated phenolic for chassis
Battery holder for two C cells
Room heating thermostat (I used Honeywell T86A but other types should work just as well)
Case, 4 x 5 x 3 inches
Rubber feet, rubber grommets, knob for potentiometer, spacers to separate circuit board from case



PICTORIAL SCHEMATIC shows all wiring and parts layout for the one-transistor circuit. Both sides of the circuit board are shown separately. Insert the transistor into its socket after all wiring has been completed, then slip batteries into holder

GB

New in Electronics



SIGHTSEEING IN FOUR LANGUAGES is the purpose of Tourmatic, a sound recording tape unit that lets a bus driver conduct a sightseeing tour in French, Japanese, Spanish and English at the same time. Located near each passenger seat are four plug-ins, each one for each language, fed from a continuous-loop tape cartridge. A special 3M tape carries the prerecorded narration. The system is now in use in San Francisco and Los Angeles

PISTOL-GRIP SOLDERING IRON solves the how-to-get-at-it problem in crowded electronic circuits. With 20 interchangeable screw-on tips to choose from, there's bound to be one to fit your job. Low wattage (40 or 60) makes iron suitable for transistor circuits, too. Made by General Electric Co., Shelbyville, Indiana

SUPER-SENSITIVE cadmium sulphide photographic light meter gives a reading even when the light level calls for a 30-minute exposure. Battery powered circuit reads reflected and incident light. Color coded scales calculate proper lens openings and shutter speeds. The KG-275 meter kit from Allied Radio, Chicago, costs $15.88

Only for readers of Popular Mechanics!

Listen to and enjoy the
LAWRENCE WELK SHOW
every Saturday night
on the ABC Television Network

$100,000.00 FREE PRIZES

offered by

Beltone®

You may already have
WON a FREE
Beltone Hearing Aid!

DON'T BE DEAF!

Mail Your Lucky Card Today!

TO COLLECT YOUR PRIZE...

If you are hard-of-hearing . . . fill out the card with your name and address and mail it today.

If you're not hard-of-hearing . . . send it in with the name and address of the hard-of-hearing friend or loved one for whom you'd like to win the priceless gift of better hearing.

Please . . . don't accept this offer unless you need hearing help or are entering the name of someone who does need hearing help.

PLEASE NOTE THESE SIMPLE RULES:

1. Only those with a hearing loss are eligible for a prize. However, if you're not hard-of-hearing yourself, you may still win a prize for a loved one or friend who has suffered a hearing loss.

2. Fill out the card opposite this page. Then mail it to Beltone Electronics Corp., 4201 W. Victoria, Dept. 4-784 Chicago, Ill. 60646, or take it to the friendly Beltone Hearing Aid Specialist who serves your community. (Check your phone book yellow pages under "Hearing Aids" to find the Beltone office nearest you.) All cards must be received by midnight, March 31, 1965.

3. Your number will be checked against the list of winning numbers, and you will be advised promptly if you have won.

4. This offer is limited to residents of U.S. and Canada and does not apply where prohibited by federal, state or local regulations. In those areas ask your Beltone Hearing Aid Specialist about a special content.

5. Offer is not open to employees of Beltone Electronics, its advertising agency, its distributors, R. L. Polk, or this publication, and their families.

YOUR LUCKY NUMBER may be the number printed on the card below. This number appears *only* in *your* copy of this magazine. Nobody else can have the same number. R. L. Polk & Co., an impartial judging organization, has already selected the winning numbers. If *your* card bears one of these numbers, you may have already won a Beltone Hearing Aid of your choice—for yourself or a loved one. There are $100,000.00 worth of these FREE PRIZES—*all for readers of Popular Mechanics.*

This is Beltone's way of bringing new hope and new help to those whose precious sense of hearing has failed or is beginning to fail. Prizes awarded only to the hard-of-hearing. But even if you yourself are not hard of hearing, you can still take advantage of this "once in a lifetime" opportunity to help someone who has a hearing loss.

Even if you now own a hearing aid, it will pay you to see if you have won a new Beltone Hearing Aid. Because Beltone's latest models are so tiny, yet so effective, you have to try one to believe it! Latest-model Beltone Hearing Aids have already brought new happiness to tens of thousands. These folks now hear clearly again, more easily and naturally than they ever dreamed possible.

This Card May Have Your Lucky Number!

MAIL IT IN TODAY!

Weapons for Hot Little Wars

(Continued from page 147)

pode and spews out lethal pellets at tremendously high velocities over a fan-shaped area when it is tripped off. It led to another ingenious idea which just might do the trick: the Claymorette. This method involves mounting a series of miniature Claymore-type units on each side of the vehicle to pour a deadly hail of pellets against ambushers.

Perhaps even more important to the Army than new counterambush weapons is the development of ambush-detection systems for use in guerrilla warfare. The ideal system would (1) detect the ambush party before it attacks, and (2) not alert the ambushers to the discovery so that they in turn could be ambushed.

While little information is releasable on new ambush-detection developments, it is known that a wide variety of approaches is under study and experimental testing—electronic, acoustic, seismic (through earth tremors), biological, and physical.

Spots Hidden Foe's Radiations

A very small portable "short-range guerrilla detector," probably using microminiature electronic techniques, is the goal of one experimental program. The rapidly growing new science of radiometry, in which objects are identified by their radiated energy with a receiving device which does not itself emit telltale radiation, may make a contribution in this field. But the extremely austere size, weight and power requirements of counterinsurgency fighters put severe restrictions on detection systems.

This has led to some exotic efforts, shrouded in secrecy, which do not depend primarily on electronics. Some concepts entail smelling out ambush parties by chemical and biological techniques.

One "way out" idea is to train certain types of birds to locate concealed forces and signal their presence back to the friendlies. Studies for the Army by a private firm have already established that birds can be taught to recognize human presence under certain conditions, and follow this recognition with a particular response.

Of course, if birds not indigenous to a particular area should be used, there would be the risk of pot shots at them by an enemy who suspected their purpose. Such attempts, however, would probably serve to tip off the friendly forces anyway.

Along with the intensified interest in guerrilla warfare since 1961 has come a procession of weird weapons proposals: the bow and arrow, the dart gun, and especially the medieval crossbow.

"For some reason, people seem to think bows and arrows are a must for this type of warfare," says one puzzled officer at the Army's new Limited War Laboratory, where many new guerrilla warfare items are under development. Investigations so far haven't shown superior qualities for the bow and arrow, he indicates. And the logistic problem would still remain. But they may well come in handy for local forces unaccustomed to firearms.

While the conventional bow-fired arrow appears to be "out," its little cousin the *flechette* is definitely "in." This small steel dart, equipped with a vane or fluted shaft, forms the basis for one of the most exciting small arms developments in recent years, the Special Purpose Individual Weapon, or SPIW (pronounced "spew").

Now approaching a crucial milestone in its development, the SPIW may well become the standard weapon of future Special Forces and airborne troops. Capable of firing interchangeably either *flechettes* at point targets or grenades for wider area coverage, the SPIW will have such prime advantages—especially for the counter-guerrilla fighter—as light weight, versatility of firepower, and improved hit capability.

Little Arrows Are Light

The tiny projectiles have a terrific lethality potential. The exceptional lightness of the SPIW system is also a favorable factor of the *flechettes* as opposed to conventional ammunition.

Unlike the conventional rifle grenade adapter, the grenade firing capability of the SPIW is instantaneous and completely interchangeable with the flechette portion of the weapon. This, along with bipod firing capability for sustained automatic fire, gives it the highly prized versatility.

In the near future, the Army expects to choose one of the four different experimental versions developed by three commercial firms and one arsenal, and get on with full-scale development. This will be a giant step, when taken; SPIW is the only small-arms weapon the Army now has under actual development, although various proposed items are tested periodically.

The "duplex" rifle cartridge, a new development which significantly increases a soldier's ability to hit his target by firing two bullets simultaneously with each shot, should contribute in a big way to the effectiveness of guerrilla fighters, especially when it is adapted to the smaller hand weapons of the Special Forces.

The second bullet, which nestles into a cavity in the base of the first, does not

(Please turn to page 206)

Before you buy a new car this year—X-Ray it!

Rambler compares popular cars in detail—and the results are available to you free. In a handsome, colorful, 48-page book, you get side-by-side photographic comparisons—facts you can check for yourself. Graphic inside information—the result of thorough engineering analysis. It's fascinating, useful and can save you hundreds of dollars.

One handy buyer's guide—the 1965 Rambler X-RAY BOOK—gives the facts. Why not compare popular cars at home in your easy chair? Get your free X-RAY BOOK at your Rambler dealer now.

American Motors—Dedicated to Excellence

RAMBLER '65

3 SENSIBLE SPECTACULARS

Ambassador: Largest, Finest New Rambler
Classic: New Intermediate-Size Rambler
American: The Compact Economy King

Watch the Danny Kaye Show on CBS-TV, Wednesday Evenings

Weapons for Hot Little Wars

(Continued from page 204)

follow exactly behind the first bullet when fired, but deviates slightly to increase the radius of the strike area.

The Pentagon's Advanced Research Projects Agency is also in the small arms research business, largely for use by friendly native forces. ARPA continues to sponsor exploratory work with the concept of subminiature rockets fired from a hand weapon, called variously Gyrojet, Microrocket, and antipersonnel subminiature rocket gun.

Experts Not Happy

The concept has been demonstrated, but not yet to the satisfaction of most experts. Accuracy at ranges more than a dozen or so yards is a major problem. Instability of the tiny rockets is one factor; attempts at correction lead to complex devices which then defeat the original purpose—a cheap, hand-held rocket gun able to fire a large number of rounds. So don't look for this one to get out of the lab soon.

The same applies to that perennial will-o'-the-wisp, the "weapons kit" which will make up in the wink of an eye anything from a pistol to a light machine gun. An effective unit just isn't in the offing.

Laser Needs Too Much Energy

As for the exotic laser, the beam of concentrated light sometimes touted as the prototype of a hand-held Buck Rogers type "heat ray," the current consensus is that the problem of providing the large amounts of energy necessary probably eliminates this item for the time being. Look for other coming laser applications, however, for such small-war missions as target ranging and night photo lighting.

The one-shot, throw-away flame projector is something else again. Prototype models for testing are now being provided by the Limited War Lab.

There is no bulky backpack-and-hose arrangement here, as in the conventional portable flamethower. This is a true "firestick," with launch tube, propellant and combustible agent in one lightweight package. The agent ignites after being propelled a short distance in front of the operator, then travels many dozens of feet to its target. Work is also going on to try to increase the number of "shots" possible from the one launch tube.

The treetop jungle canopies for helicopter landings are also in the prototype test stage. The advocates of this idea, greeted with skepticism in some quarters, think it could signal a marked advance in use of choppers in densely wooded areas.

Now the whirlybirds either have to find clearings or the demolition boys have to blow up enough trees to create one. Both are time consuming and disruptive of the major objective, which is to offload troops and gear as close to the enemy as possible. If they can create their own treetop heliports at will, they can be used for staging areas, observation posts, listening stations, even for troop bivouac.

The core of the system is a perforated 16-foot-diameter matting of aluminum. This is lowered by the helicopter onto a crisscross of nylon nets. Testing is to be conducted soon in the southeastern United States.

Treed for 24 Hours

The line-descent brake is an important adjunct to the treetop canopy. Originally developed for emergency use by a parachutist entangled in the trees, the lightweight device permits controlled descent by rope friction on a ladder-type series of hollow aluminum rungs. Including 150 feet of rope, the unit weighs about six pounds. Paratroopers entangled in dense tree growth have sometimes required as long as 24 hours to extricate themselves.

These are but a few of the items of equipment being fashioned in military and industry laboratories and workshops to try to provide this country with the kind of superiority at "the lower end of the spectrum" that it now possesses in strategic missiles and aircraft.

The Limited War Lab, for instance, has worked on leech repellants (lanolin added to a standard formula keeps the repellant on the skin much longer in wet climates); special high-frequency radios (the background interference in southeast Asia is 100 times greater than in such other dense areas as Panama); ration and survival kits tailored for hot, cold and dry climates; smoke grenade improvements; load-handling equipment for jungle areas; fuel pumps and filters to meet the special needs of helicopters in these areas; boats with ducted fan engines to buoy them up over obstructions; a rifle sight with built-in centering devices to speed the training of recruits; and numerous projects in a variety of fields that are still secret.

In view of the "balance of terror" being accomplished by nuclear weapons with respect to "big wars," it becomes increasingly possible that crucial future issues may well be decided by the success or failure of relatively small groups of fighting men in far-off jungles, deserts and mountains, engaged in "dirty little wars" that might be won or lost depending on the forethought that went into their equipment. ★★★

A wood paneled room in a weekend?

You can't beat the system.

The Weldwood® system—fastest way to panel a wall! Start with new Weldwood Panel Adhesive in the convenient caulking-gun cartridge. Just a bead of adhesive on studs or furring strips holds panel in place for keeps. No unsightly nail holes, no hammer dents. Then color-match all moldings, doors, trim and built-ins to the paneling with new Weldwood Color Tones.™ No guesswork, no measuring. Color chips make it quick, easy to match 138 shades. Next, seal *and* finish in one operation with Weldwood Satinlac®. Gives a natural satin sheen without a heavy "built-up" look. Won't yellow. Finally, fill nail holes in molding with matching Weldwood Putty Stik®. Install the wall, stain and finish the rest—all in a weekend. What a system!

WELDWOOD®

United States Plywood, Protection Products Division, Kalamazoo, Michigan

Come see us at the New York World's Fair—Better Living Building.

Remote Wind Indicator

(Continued from page 154)

of the short side and drill a ¼-in. hole. After you have drilled the hole, round the end of the short side with a file or grinding wheel. Finally, insert a ¼-in. bolt to act as a shaft for the small ball bearing (¼-in. I.D. and ⅝-in. O.D.). Small washers placed between the bearing, arm and nut will hold the bearing in place. These should be small enough so that they won't extend beyond the inside race of the bearing.

The next step calls for fitting this assembly to the rotating shaft. Place the long side of the arm in the slot you have cut in the pipe, positioning it so that the outside edge of the bearing meets the copper segments of the stator as close to parallel as possible. Now, holding it in the slot with your hand, rotate the arm carefully to see that bearing is running properly and that it doesn't hit any bolt heads. When it is positioned so that it moves around the complete circle without obstruction, make a mark on the pipe for a hole that will intersect the metal strap and drill a hole through the pipe and arm for a 3/16-in. bolt. When bolting the arm in the pipe, make sure that it isn't so tight that it binds the arm and prevents it from pivoting on the bolt.

The ball bearing on the rotor must make constant contact with the copper segments. To ensure this, first drill a 1/16-in. hole in the rotor arm at the point where it makes the twist. Next, cut a ¼ x ½-in. strip of copper and drill a 1/16-in. hole in one end. Solder this strip to the rotating shaft as close as you can to the brass bushing which holds the plexiglass in position. Install a small coil spring with one end in the hole on the rotor and the other in the copper strap. This spring will draw the ball bearing up against the segments and insure positive contact.

Construction of the vane will depend on the design used. Designs such as a flying duck, sail boat or dog can be attached to a piece of ⅜-in. pipe by cutting a slit in the pipe, inserting the base of the design and soldering it in place.

Whatever design you choose for the vane, make a paper pattern before you start cutting the sheet copper or galvanized sheet iron. Also, be sure to make the vane large enough. A sheet of metal about 12 x 15 in. is sufficient for this purpose. It can be cut with a tin-shears or a sabre saw.

Naturally, it's important that the rotor and vane point in the same direction. The simplest way to accomplish this is by placing the complete assembly in a vise. Use a level to make sure that the long pipe shaft is in a horizontal position.

One end of the tee of the vane assembly is still open. Slip this over the ⅜-in. pipe opposite the rotor-stator end. Because of gravity, this assembly will assume a position with the arrow pointing straight up. Now, turn the rotor until the bearing that contacts the copper segments on the plexiglass is also pointing straight up. With the arrow on one end and the rotor on the other end pointing straight up, solder the vane in place at the tee.

Only one more step remains to complete this phase of the assembly. Cut an 8 x 12-in. piece of galvanized sheet iron and inscribe a 1⅛-in.-dia. circle exactly in the center of this sheet. Cut in from one edge of the sheet and cut out the circle in the center. By bending the sheet at the cut, you can slide it over the 1-in. copper pipe, where it can be soldered in place. It should be positioned about 24 in. from the vane end of the assembly. Before soldering it in place, determine the pitch of your roof and position the sheet at the same angle when soldering it to the pipe. Seal the entry cut with solder.

Install the unit as close to the peak of the roof as possible, locating the center of a 2-in.-dia. hole for the pipe 2¼ in. from one of the roof rafters. Drill this hole from inside. Next, remove the stator-rotor assembly and insert the shaft through the hole in the roof, lifting the shingles so that you can slip the galvanized sheet under them. Then, while holding the assembly plumb, nail the galvanized sheet in place on the roof. To prevent leaks, spread caulking compound or tar over the sheet of metal and on the shingles when replacing them.

To secure the assembly in the attic, cut a 2 x 4 long enough to reach from a rafter on one slope of the roof to a rafter on the opposite slope about 30 in. below the peak and nail it in place. After plumbing the shaft with a carpenter's level, secure it to this length of 2 x 4 with a 1-in. pipe strap. You may have to shim a little to make plumb, but it is extremely important that the shaft be exactly vertical. Place another 1-in. pipe strap around the pipe on the roof rafter where it enters.

After the shaft is secured, reassemble the rotor and stator, making certain one of the segments of the stator is pointing to the north. Then tighten the stator to the shaft so that it will not move from this position.

The simplest method of installing the indicator panel is to mount it in a square cabinet with nine equal compartments, three in each direction. (Plans for such a cabinet appear on p. 154.) Mount a small

Christmas-tree "twinkle light" socket in each one of the eight outer compartments by drilling holes in the back panel just large enough to accept the sockets and gluing them in place.

To connect the panel to the stator, take one wire from each socket, scrape the insulation from the end, twist all eight ends together and solder. (These wires all go to a common source.) Connect the remaining wires from the sockets to a multiple-wire, color-coded cable leading to the segments on the stator mounted in the attic. One of the wires is attached to the supporting shaft of the assembly, which is actually the ground for the rotor. Eight of the wires are attached, one each to one of the two bolts in each of the eight copper segments. One each of the corresponding color-coded wires is attached to wires leading to sockets in the panel assembly. The cable can be run from the attic down through a wall to the panel.

WIND INDICATOR MATERIALS LIST

1 pc.	1" i.d. rigid copper pipe, 5'
1 pc.	3/4" i.d. rigid copper pipe, 1'
1 pc.	3/8" i.d. rigid copper pipe, 6'
1 pc.	3/8" i.d. rigid copper pipe, 3'
1 pc.	3/8" x 3/8" copper coupling
1 pc.	1" x 1" threaded/sweat copper adapter
1 pc.	1" x 3/4" copper reducer-coupling
1 pc.	1 1/4" x 3/4" copper reducer-coupling
1 pc.	3/4" x 3/8" copper reducer-coupling
1 pc.	5/8" o.d. ball bearings, 1/4" i.d.
1 pc.	1 1/8" o.d. ball bearing, 1/2" i.d.
1 pc.	Plexiglass disc, 5"-dia.
1 pc.	16-oz. (or 23-ga.) copper, 5" x 5"
2 pcs.	1" pipe straps
1 pc.	1-5/16" i.d. hard rubber or Bakelite washer, 1 7/8" o.d.
1 pc.	1" x 1 1/4" brass bushing
1 pc.	8" x 12" 28-ga. galvanized sheet metal
16 pcs.	1/8" x 3/4" bolts
1 pc.	1/8" x 3/8" x 8" strap brass (for arm)
1 pc.	10-conductor wire to run from stator to panel, length as needed
1 pc.	Bell transformer, 110-v. to 10 v. or 15 v.
1 set	Christmas-tree "twinkle" lights

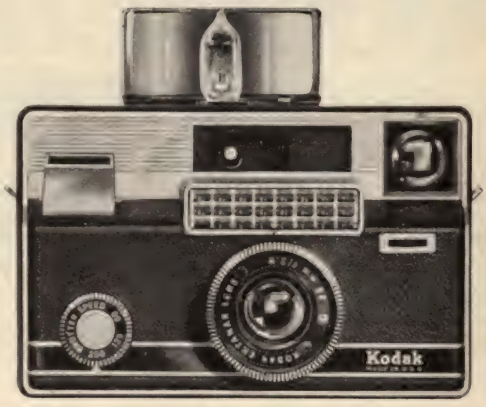
A 10- to 15-v. bell transformer in the basement provides the power. One of the low-voltage wires is connected to the eight wires soldered together in the panel. The other wire from the transformer is connected to the wire that carries the current to the shaft of the assembly. As the vane turns with the wind, the rotor makes contact with the different segments of the stator and completes the circuit to a corresponding light in the panel.

A flashed opal glass large enough to fit over the front of the panel is used to diffuse the light. On this you can place decal letters to identify the wind directions (These letters are available in various sizes at most stationery stores.)

As a safety precaution, be sure to ground the wind vane as you would a TV antenna. ★ ★ ★

Kodak

does practically everything for you automatically and



....loads instantly, too!

The KODAK INSTAMATIC 800 Camera is the most convenient, most automatic, most *helpful* precision camera in the world today. It loads *automatically* . . . *automatically* adjusts for film speed . . . *automatically* advances the film for you after each shot . . . *automatically* adjusts the fast *f*/2.8 lens for correct exposure . . . *automatically* switches to flash speed when you pop up the built-in flash holder . . . *automatically* indicates by rangefinder when focus is correct . . . and more, much more!

This extraordinary precision camera costs less than $130. See it—and other models at other prices—at your Kodak dealer's.

Price subject to change without notice.

EASTMAN KODAK COMPANY, Rochester, N. Y.

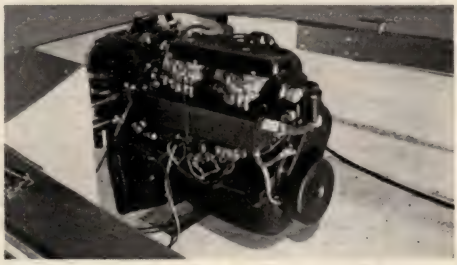
Now...4-cycle power, performance and fuel economy for boats

BRAND NEW 60 hp MERCRUISER STERN DRIVE

THE ENGINE: Up until now, there were three practical ways to power a small boat: an outboard engine, oars, or a sail. Inboard engines took too much room in the middle of the boat.

Now, a true "compact," MerCruiser 60 Stern Drive, makes it possible for you to enjoy the convenience, fuel economy and low maintenance of a 4-cycle inboard *without losing room in the boat.* Why? Because MerCruiser's compact 60 hp engine is mounted directly to the transom where it takes no more room than the motor well for an outboard.

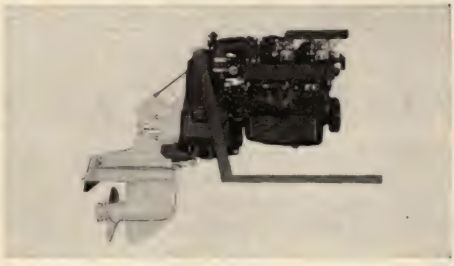
Four-cycle marine engines have long been a favorite of many boaters and MerCruiser 60 is the newest design in light, compact 4-cycle power. It has a direct-drive alternator . . . no brushes to wear, no contacts to arc, and no regulator required. We eliminated all belts. Its direct-drive water pump is "outboard" and equipped with a telltale so you can tell at a glance that it's working properly. The ultimate in vibration isolation, new Dyna-Focal aircraft-type



mounts mean a new definition of silence . . . eliminate mounting rails and engine bed! MerCruiser's husky new engine and new drive unit counterbalance each other on the transom. Simple to install. All steering and control mechanisms are inside the boat.

MerCruiser 60 uses conventional 4-cycle fuel and oil. Fuel consumption is dependent on boat and load conditions but our test boats with MerCruiser 60 have been running 4½ to 5 gallons per hour at full throttle . . . that's from 25 to 36 miles an hour on 14 to 18 ft. boats. At cruising speed, the fuel consumption is as low as 3 gallons per hour.

as small as 14 ft.



THE DRIVE UNIT: Much of the new MerCruiser 60's performance comes from the inherent advantages of a stern drive: propeller thrust parallel to the plane of motion; adjustable tilt angles; and no angled prop shaft, strut, or rudder to cause drag. Much also is due to MerCruiser's smooth, one-piece castings, adequate gear reduction ratios, and exclusive Jet-Prop exhaust. The Jet-Prop reduces drag, improves engine breathing and buries noise and fumes far behind the boat. The MerCruiser 60 drive unit has an exclusive cable tilt mechanism that allows you to adjust the drive angle for shallow water running or to raise the unit out of the water, entirely, for inspection or beaching.

Why don't you drop by your MerCruiser dealer's today, and take a stern attitude with him. He'll show you why more MerCruisers are sold than all other stern drives combined . . . 60, 110, 120, 150, 190, 225, and 310 hp gasoline; 60 hp diesel.

MERCRUISER

STERN DRIVE POWER PACKAGES

WORLDWIDE SALES AND SERVICE

(C) 1965, Kiekhaefer Corporation, Fond du Lac, Wisconsin and Toronto. Subsidiary of Brunswick Corporation.

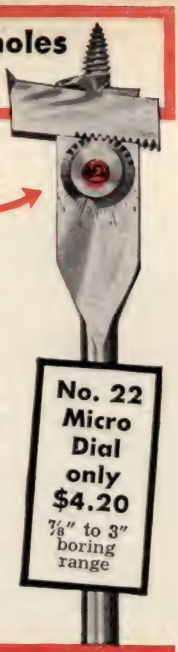
Bore 35 standard holes with just one tool

New IRWIN Expansive Bit

lets you dial your size

Just turn the dial and you're set to go with this new Irwin Expansive bit. No hunting for the size you need. Fits all hand bit braces. Clean, fast, accurate boring action from 7/8" to 3"—35 standard hole sizes in all!

And what a really fine precision tool to own. It's drop-forged from special bit steel, heat treated full length, machined for accuracy and sharpness, highly polished, too. Two cutters supplied with each bit. Model No. 21 with 5/8" to 1 3/4" boring range also available. Ideal for home handyman, professional woodworker, or farm. See your independent hardware dealer soon.



No. 22 Micro Dial only $4.20

7/8" to 3" boring range

IRWIN

Wilmington, Ohio

the original solid center auger bit

•

screw drivers

screw driver bits

RADICALLY NEW WAY TO STOP RUST FOREVER!

get KURUST

- **Works by revolutionary new process**
- **Turns rust into rust-proof coat**
- **No rust remains under coating**
- **Takes any paint; oil, metallic, cellulose**

Just brush away loose, powdery rust from metal surface—then paint with KURUST. Protects against all corrosive conditions—humidity, salt water, fumes, exposure. Combines chemically with the rust itself to form a rust-proof metallic coat. No layer of active rust remains under the coated surface (as happens with leading sprays and other so-called rust-proofers). Even if the KURUST coat is scratched, rust will not spread under it. The coating is in direct contact with the metal, bonding firmly and smoothly to insulate against corrosion. Use on any rusty, iron or steel surface. Results guaranteed.

Available at paint, hardware and auto supply stores.

For free folder, write: Halo Sales Corp., 444 Townsend Street, San Francisco, Calif., or Kurust Distributors, Ltd., 1919 W. 53rd Ave., Vancouver, B.C. Inquiries from distributors and dealers invited to San Francisco address.

Our First Moon Scout

(Continued from page 130)

and do a score of other jobs—this is a tremendous task. Then add three complications: The scientific payload cannot exceed 65 lbs., everything that Surveyor learns must be relayed a quarter of a million miles to earth, and the moon craft must be able to "live" in a 500-degree temperature range.

All this seems like an impossible assignment and yet, by combining pure science and down-to-earth engineering, the Hughes' staff has reached solutions that appear simple, once they are explained.

Built-in Temperature

How, for instance, can the electronics equipment be kept at between 0 and 125 degrees F. when the outside temperature climbs to 260 degrees F. during the day, and then plummets to minus 240 degrees at night?

"Actually, battery energy will maintain a comfortable inside temperature at night," explains Sheldon C. Shallon, Hughes' chief scientist for Surveyor, "and thus the real problem is daytime heat dissipation.

"So, for once, the electronics 'black boxes' are pure white, for maximum reflection of the sun's heat. Inside the white skin there's a super-insulation of 75 layers of aluminized Mylar, crinkled so that one sheet touches the next only here and there.

"If the inside temperature still climbs too high, bimetallic switch buttons will click together and provide a metal heat channel to a glass window that has a mirrorlike one-way coating. The window admits very little outside heat, yet can radiate a great deal of interior heat."

Does the system work? The electronics white boxes have been "baked" under a solar simulator (heat lamps) in a vacuum chamber. And they have been chilled with liquid nitrogen until their temperature was that of the utter cold of the lunar night. The system works perfectly.

Can Break Concrete

Again, how would you design a device to "determine the mechanical characteristics of the lunar surface?"

On Surveyor the answer is simple and direct. The "soil sampler" is merely an instrumented pantograph arm that has a reach of four feet, extended, and that swings left or right on command. Spring-loaded, it can whack at the surface like a pick (it's strong enough to break half an inch of concrete). It can dig a hole 20 inches deep, can claw a furrow by retracting itself and meanwhile measure the drawbar pull.

These operations will be performed upon radio command from technicians stationed in Jet Propulsion Lab's operations room in Pasadena, who will watch the results on television. If small rocks happen to be in the way, the mechanical arm can push them to one side and then attack the material below.

To analyze the composition of surface materials, a beam of alpha particles from radioactive curium is used. The "scattering" of the alpha particles provides a rough measurement of the elements that are present, such as calcium or iron. The device can distinguish between meteoritic and igneous rocks.

A seismograph bolted to the spacecraft's frame not only will detect moonquakes, if any, it will also determine if there is much expansion and contraction of the surface because of temperature changes and will even pick up the impact of meteorites hitting at a distance.

Cameras' "Eyeball" Moves

One of the most sophisticated portions of the lunar lab is its television section and, in particular, a pair of "survey" TV cameras. They can look almost all of the way around the horizon and take stereo picture pairs of about a third of the adjacent area. The cameras are actually stationary: they peer into pan-and-tile mirrors in their hoods. It is the hood and mirror "eyeball" that moves, guided by tiny motors.

Obeying radio commands, the cameras will change from close-up wide angle to semitelescopic, will change lens apertures from f/4 to f/22 and will even change filters to permit construction of true color photos on earth. By stereo-ranging, distances to features such as cliffs and craters will be measured so accurately that topographic maps can be prepared.

Blood Will Boil

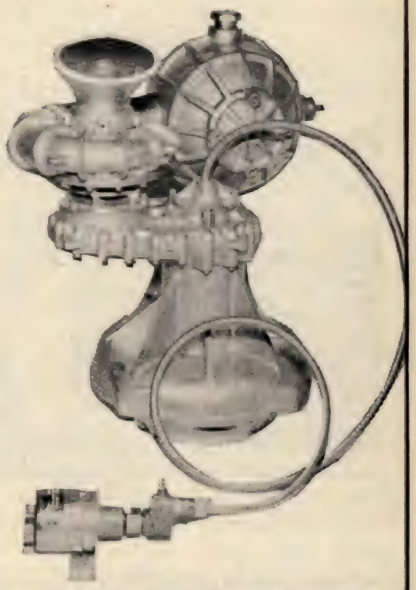
A century or so ago, "civilized" nations used to deport some of their worst criminals to awesome parts of the earth where the heat, insects and disease soon killed them off. Today, paradoxically, we are planning to dispatch three of the fittest, bravest Americans to a hell far worse. On the moon the daytime temperature is above the boiling point of blood. At night, without protection, you would freeze in a microsecond. There is no air, no water.

To fire men out into space toward the moon, land them there and then bring them safely back to earth, will be the most fantastic undertaking yet attempted by mankind.

Surveyor, the "mechanical American," will lead the way. ★ ★ ★

360 HP TURBINE FOR VOLKSWAGEN

OTHER SIZES AVAILABLE
FROM 45 TO 850 SHAFT HP



BOLT IN REPLACEMENT
138 MPH TOP SPEED
1 YEAR GUARANTEE
PROMPT DELIVERY

124 M.P.H. 10.2 SEC. E.T.

TURBONIQUE, INC., P. O. BOX 8641, ORLANDO, FLA.

☐ $1.00 Encl. For new 28 page catalog, prices. ☐ $2.00. Send 33⅓ rpm recording of operating noises. ☐ $3.00. Send technical manual. ☐ $5.00. Send 8 mm. x 50 ft. color demonstration film, or ☐ $10.00. Send everything. All money refunded first order.

Name_____

Address_____

City_____ State_____

NEW SANDWICH

MAKES THIS ALUMINUM LONE STAR VIRTUALLY UNSINKABLE, LEAKPROOF, QUIETER AND A HECK OF A LOT FASTER!

This is the SOVEREIGN. A 19-ft. news-making tiger of a boat. It's ARMOR-HULL, new "sandwich" hull construction technique. To make it, Lone Star used aluminum for the outer hull, FOAM-PAC for the center, fiberglass for the inner hull. Then, bonded them together as one material with unrivaled qualities of strength, flotation and impenetrability. There are several reasons why Lone Star is the first company to conceive and create ARMOR-HULL. One, FOAM-PAC. Lone Star developed this high-density polyurethane foam, with 7 times the strength of ordinary foam, three years ago at a cost exceeding $100,000. Two, production skill. Lone Star's two decades of boat building experience make it possible to originate a new hull . . . load it with equipment . . . price it competitively. Result — the SOVEREIGN. Impervious to leaks. Next to impossible to sink. Practically rivet-free so it goes much faster . . . in well-insulated quiet. Check smart-looking outboard and I/O versions at your Lone Star dealer's. Or write today for free color catalog on the "Funmakers", Lone Star's complete line of aluminum and fiberglass fishing boats, runabouts, cruisers and boat trailers.

Lone Star®

LONE STAR BOAT COMPANY

Headquarters Plant: 1022 Industrial Ave. • Plano, Texas

Laughing Tables

(Continued from page 122)

It wasn't quite *that* simple, of course. If you talk to Parkwood's plant manager, Hollis French, he'll fill you in on a few of the problems as he walks you around the factory behind a four-by-eight-foot laminate containing a pair of table tops.

"When the Fred Waring request came," says French, "we were intrigued. We can't take on such limited production projects as a rule, because they'd tie up the plant. But this one had national appeal, and it posed some tricky problems. You don't just slip a bunch of cartoons drawn on any kind of art paper, with all kinds of paint, into a laminate. Many papers would shed the plastic, and some pigments are incompatible with the resins we use.

"Since we'd pioneered development of quality woodgrain reproduction — using four colors in a rotogravure process—we knew the headaches involved."

Blistered Funnies

First of all, the cartoonists had to redraw everything on special resin-treated paper, using special inks. "Even so, we had troubles," recalls French. "Certain color inks refused to soak up the top protective layer of melamine resin, and raised blisters on the finished sheet."

Today, however, the bugs have all been worked out. Every few months, a batch of table top cartoons sneaks through the line at Parkwood—along with a regular run. Like the printed woodgrain reproduction, the cartoons constitute the "design sheet," topping a pile of seven or eight layers of brown Kraft core stock impregnated with phenolic resin. Over it, last of all, goes a special rayon base paper impregnated with melamine resin.

This sandwich—about two inches thick—is stacked between metal plates, and slides into a press that clamps down on it to the tune of 1000 pounds per square inch at 280° F. When "cooked," it comes out looking just like the slick material that goes on your kitchen counter—about 1/16th of an inch thick. The top sheet has melted into a hard, indestructible transparent surface protecting the colorful cartoon design sheet beneath it.

Thus "immortalized," the Shawnee cartoons are shipped to Cataraugus, N.Y., where they are bonded to a plywood tabletop fitted with a Waring-designed edge molding. From there they go to Bill Flick's carpenter shop at the Shawnee Inn.

"I just bolt them to iron pedestals, shim them up and set them out in the place reserved for them in the Cartoon Room," he explains. ★★★

BUICK MOTOR DIVISION

The new Riviera Gran Sport or, How we put muscles on the Riviera's muscles

If you start messing around with a fairly normal looking Riviera someday and it suddenly commences making loud noises and leaves you fast sinking astern, that we're happy to say, was no normal Riviera.

What we've gone and put together is a land version of the wartime Q boat, i.e., a merchantman with hidden guns.

What's this? you say. Buick rattling its sabre and uttering warlike cries? They're supposed to be in the business of making nice, big, reliable, well-engineered, soft-riding automobiles.

We still are. But we've opened a new branch office.

Which brings us back to the Riviera Gran Sport. It packs what might be termed pretty heavy artillery: 2-4BBL, 425 cubic inches, 360 horsepower and 465 lb-ft of torque. And it plasters all this down on the road via a limited-slip differential with 3.42:1 gearing.

The steering is power assisted, with an extra-quick 15:1 gear ratio available for it. The brakes, also power assisted, are massive 12-inch finned aluminum drums up front, 12-inch finned cast iron on the back. Specify the heavy-duty set of springs, shocks, and stabilizer bar and you have the complete Q boat.

Next month we're doing something loud and strong with the Skylark. Keep watching this space.

More Riviera Gran Sport Standard Equipment: *Automatic transmission—3-speed torque convertor; 2¼" low-restriction dual exhausts; 8.45 x 15 tires on 6JK rims; bucket seats; console; padded dash; tilting steering wheel; full carpeting; 2-speed wipers; washers; map light; back-up lights; trunk light; smoking sets, front and rear; electric clock; speed warning buzzer; trip mileage indicator; things like that.*

Is Aviation Going Automatic?

(Continued from page 113)

beacons in the middle of the ocean."

True, some long-range radio navigation aids, such as the American Loran and the British Decca and Consol, do stretch over the ocean, Granger explains. But they depend on long-distance radio reception, which gets temperamental at times. "Ultimately we had to rely on celestial navigation—taking a fix on the stars, the way mariners have been doing for centuries."

Stars Okay for Slowpokes

"It worked pretty well for slowpoke piston planes," Granger remembers. "They give you a relatively stable point from which to take your stellar readings. Then you'd sit down and plot your position. For a three-star fix, that took about 12 or 13 minutes, when a new reading was needed."

At jet speeds, the navigator's job gets more hectic. If you are flying 600 m.p.h., you are already 150 miles beyond the point at which you took the reading before you figured your fix. And you might be more than 100 miles off course. You'd be zigzagging all the way across the ocean, correcting your course after each fix.

TWA was the first to solve this problem with Doppler navigation—a self-contained electronic system that largely eliminates the need for celestial readings or ground-based radio aids.

Captain Granger, who still likes to trade his executive chair for a pilot's seat whenever he gets a chance, demonstrated Doppler navigation for me under actual flight conditions. Our course—a vast arc swinging around part of the globe from Kennedy Airport, New York, to Orly Aerodrôme, Paris—was broken into five segments. Before takeoff, Granger reached up to the overhead control panel in the cockpit of the huge Boeing 707 and dialed instructions into the Doppler system's course computer. "Compass heading 086 degrees; 1000 miles to go." That was the first leg of the trip. It would take us to the Great Banks off Newfoundland.

Over-Water Flight

When the plane had pushed itself to cruising altitude—34,000 feet—Granger cut in the Doppler, linking it directly to the autopilot. Now the Doppler was in control of the ship. I watched the computer read out instruments, giving us continuous readings of groundspeed, heading, drift, and miles-to-go until the next course change. One indicator automatically registered deviations from the preset course. Sometimes it flipped slightly off center, warning us that we were about two miles off course. But then it came right back to zero, as the autopilot moved in and nudged our nose back on the correct track.

"That's sidewind," said Granger. "Occasionally we get a gust that blows us south. But the Doppler puts us right back on course. Without the Doppler we wouldn't even know the effect of a wind change until we took the next fix. By that time we'd be a long way off. But the Doppler monitors the course continually and makes instant corrects for drift. This way we don't zigzag."

Meanwhile the miles-to-go dial was spinning down toward zero. Ten miles before the scheduled course change, the Doppler flashed a warning light. Now we were to veer eastward over the open sea. Granger reached up and set the second leg of our course into the machine: "Compass heading 103 degrees, 520 miles to go."

When the first leg was completed, the Doppler computer automatically switched over to the second course setting, banking the plane into an imperceptible turn.

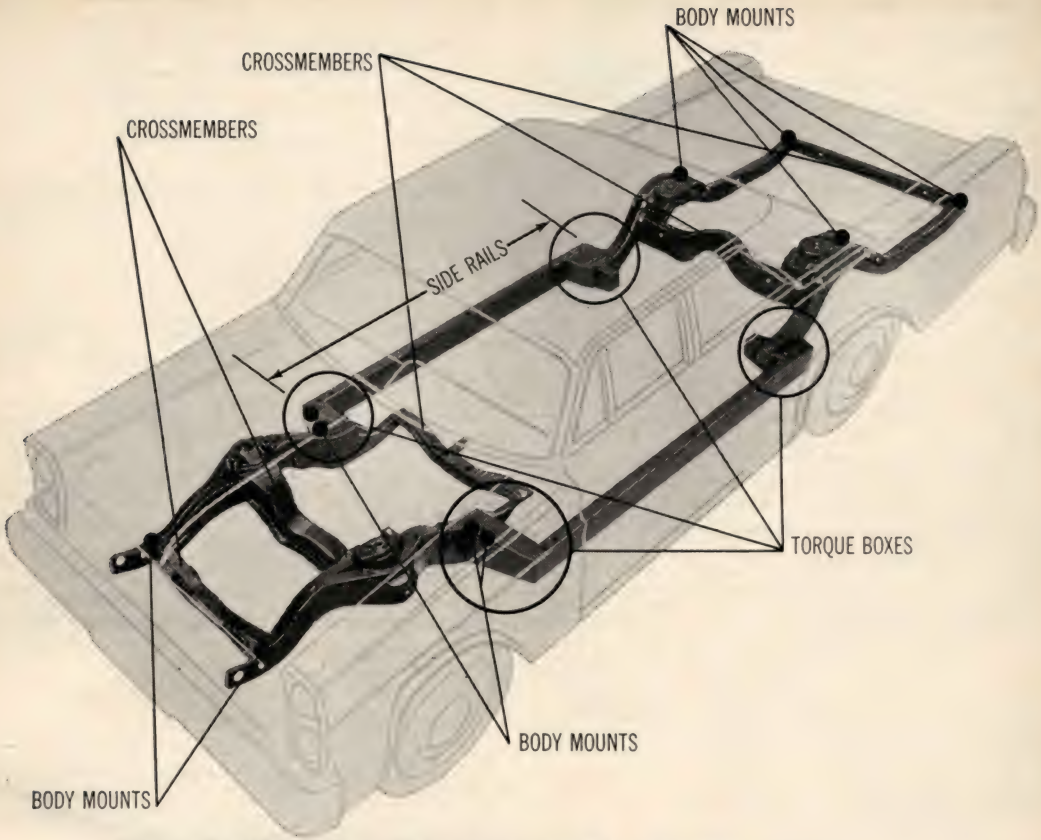
"If for any reason it hadn't switched to the new course, a special warning light would have lit up," explains Granger. And, he adds with a grin, "The reason I had them put in that warning light is that the Doppler has never yet failed to make a scheduled course change. Something that reliable makes you overconfident."

Sophisticated Radar

In essence, Doppler is a sophisticated kind of radar, which senses the frequency shift in a radar beam after it is reflected from the ground or ocean surface. Four beams are sent out from the aircraft at forward, rearward, and sideways angles. If the plane moves toward the place where a beam hits the ground, the returning echo will be higher in frequency than the beam sent out. If the plane moves away from the point of reflection, the frequency of the returning echo is lower (because of the so-called Doppler shift, named after the Austrian scientist who discovered this principle, as applied to sound waves, more than 100 years ago). The frequency shifts are exactly proportional to the plane's speed toward or from the four beams' reflection points on the ground. From these data, a small computer calculates the speed and direction of the plane's motion with respect to the ground, monitors its flight path, and keeps it on course.

Course adherence is so accurate with Doppler that on a 3000-mile overwater flight, planes are rarely more than two miles off their charted track. This may allow the airlines to pack more planes into

(Please turn to page 218)



Ford Motor Company's new road-tuned "Ring of Steel" frame reduces rough rides to a memory!

A Ford or Mercury frame is a road-tuned "Ring of Steel," an advanced design scientifically developed in our labs and solidly proved on our test tracks. It is a totally new way of combining torque boxes (front and rear), full length deep-box side rails, ladder-type crossmembers, and low-resiliency body mounts.

The four flexible torque boxes absorb shocks. The butyl rubber body mounts isolate the body from the frame—further diminishing vibrations and harshness. And the frame itself, in the shape of rugged side rails and crossmembers of steel, encircles the passenger compartment. The effects of jolts and jounces, road noise and surface flaws never reach the body—they're tuned out by the frame. You and your passengers sit within a road-tuned ring of steel. The ride is smoother, softer, surer all the way.

Try a revelation ride in a new Ford or Mercury first chance you get.

The smoother ride for '65 comes from . . . Ford

MUSTANG • FALCON • FAIRLANE • FORD
COMET • MERCURY
THUNDERBIRD • LINCOLN CONTINENTAL

MOTOR COMPANY

You Can Develop A Profitable Business on A Shoestring

Make $5.00 an Hour in Your Own Home

I wish there was space here to print the hundreds of letters received from men I've put in business with the *Belsaw Sharp-All*. With this precision machine you can sharpen all popular household, garden and shop tools easily and quickly. You need no previous experience . . . no inventory, no selling, no space to rent

I've Done It for 40,000 Men

I have been helping men get into this profitable business for over 30 years. I'll finance you to get started . . . give you all the instructions and help you'll need to really succeed. I'll keep you informed HOW others are making big cash profits every day. No obligation.

So don't delay. Send coupon for FREE book today.

STAN FIELD, President
Belsaw Sharp-All Company
715R Field Bldg., Kansas City, Mo. 64111

Name_____

Address_____

City_____ St._____ Zip_____

TELESCOPIC ARM EXTENDS A FULL 17 INCHES

...it's the new

"MOBILETTE-77" MAGNIFIED HIGH-INTENSITY LAMP

ONLY 5½" HIGH WHEN CLOSED

A pretty, little lamp that gives you the equivalent of 150 watts of clean, white, glare-free light for Hobbies or Homework ...Sewing or Sawing. Useful at home, at work...anywhere you use your eyes!

- Condensor Lens—an idea borrowed from superjet planes, magnifies and spots light exactly where you want it!
- Telescoping Arm—extends from 5½" to 17"...and holds firmly at any point along the way!

COMPLETE WITH BULB & BUILT-IN BRACKET FOR WALL MOUNTING

only $14.95 ppd

ORDER NOW • SATISFACTION ASSURED
Send check or Money Order.. no COD's please.

"MOBILETTE-77" is available in attractive color combinations of Gold/Black, Grey/Black and Rust/Brown.

CONSUMER LIGHTING, Dept. M-1
BOX 78, NEW HYDE PARK, N.Y.

Is Aviation Going Automatic?

(Continued from page 216)

a given airspace without sacrificing safety.

For all its merits, Doppler still has some drawbacks. It gets its heading information from the plane's compass, and airborne compasses sometimes get slightly erratic. For this reason the Doppler must be recalibrated at the outset of each trip. So you need some other navigation method—celestial or Loran—to check the Doppler. Besides, the Doppler works best over choppy water. If the sea is very calm, the radar beams glance off the smooth surface at an angle (as from a mirror) and only a tiny fraction of the beam's energy bounces back to the plane. Calm spots in the ocean can cause the Doppler to conk out momentarily and lose count of the plane's mileage, though it automatically gives warning whenever this happens.

To get around these drawbacks, Sperry Gyroscope Company has developed an even more advanced navigation system that takes its cue from the inertial guidance used in military missiles. Pan American World Airways is now installing this inertial system in 55 of its Boeing 707 jets.

Inertial Guidance for SSTs

Basically, inertial guidance provides the pilot with the same data as Doppler but derives the information in a different way. Instead of measuring radar reflections from ground or sea, the self-contained inertial-guidance system uses gyros to sense all changes in aircraft speed and direction. A computer tallies up all these changes along the entire trip and converts them into readings of position, speed and drift.

In operation, inertial guidance is even simpler than Doppler. Instead of having to set his course and distance into the computer, the pilot simply dials the geographic coordinates of his starting point and destination into the control panel. The computer figures out the course and distance.

Because of its high accuracy and total independence of any outside reference point, inertial guidance will probably be the standard navigation system when tomorrow's SSTs burn up the sky on their 2½-hour hops to Europe.

When you're pushing Mach 3, even the slightest navigation error mounts up to an enormous distance in a few minutes. A plane going astray at 2000 m.p.h. may soon find itself in serious trouble—running out of fuel or crossing into neighboring traffic lanes. But electronic navigation will help keep the monstrous speed demons on a tight leash, and electronic landing systems will help bring them safely down to earth. ★★★

Silencing Squeaks in Hardwood

(Continued from page 177)

"no" unless you want to start ripping out floorboards and installing a new floor.

"How about all those 'wonder' fillers," you might query, "Isn't there one that'll do the job?"

Here's what the Forest Products Laboratory of the U. S. Department of Agriculture has to say on this:

"There is no satisfactory way to eliminate such cracks short of taking up the floor and relaying it. If the cracks are filled with a soft putty or crack filler in the winter, some of the filler may be squeezed out during the following summer to be tracked over the floor. If a wood filler is used, the wood may be further compressed during the summer. In either event, the cracks will open again during the next winter and may become worse than before filler was applied." So when cracks develop, your best bet is to learn to live with them.

You *don't* have to live with a floor that's spotted with stains, gouges, splits or rot, however. You can patch such areas with new flooring. The job isn't hard (several of the steps are shown on page 177).

1. Measure off the damaged area and draw a line above and below it, at right angles to the side joints. If possible make *one* limit line the end of the existing board, but don't make your patch shorter than 10 inches, or it'll *look* like a patch.

2. With a large bit, drill a hole in each corner of the damaged section, close to the limit lines.

3. Use a sharp chisel to tap cuts across the strip, on the lines at each end, between the holes. Then split out the marred board, end to end, with the grain. Be careful not to damage the tongue and groove of adjoining pieces.

4. Cut a square-end piece of new flooring to the length of the finished hole. Naturally, if your floor is oak, you use a piece of oak—if maple, use maple. In order to sink this piece into place, you'll have to trim off the bottom flange of its groove, to clear the tongue of the adjoining piece.

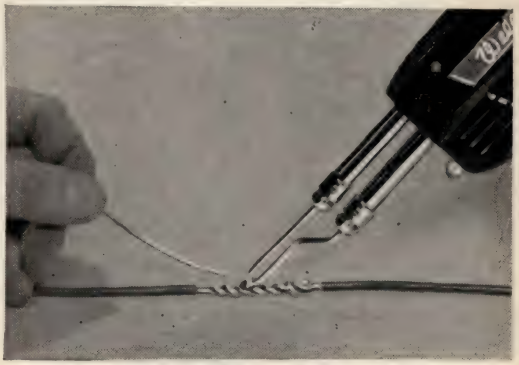
5. Insert the tongue of the patch-piece into the groove of its neighbor and press it down carefully. Seat it firmly by tapping with a hammer on a scrap block.

6. Nail each corner through pilot holes drilled slightly smaller than the finishing nails. Countersink the heads.

7. If the replacement piece is slightly raised above adjacent boards, plane or sand it down flush to the floor.

8. You can now match the patch to the color of the rest of the floor with stain, or crayon rubbed in with alcohol. ★★★

SOLDERING TIPS FOR ELECTRICAL PROJECTS



HEAT WIRES NOT THE SOLDER

Wires or leads will then become hot enough to melt the solder and it will flow into the joint. Never apply heat directly to the solder.

USE PROFESSIONAL EQUIPMENT

Virtually all radio and TV servicemen use Weller Dual Heat Soldering Guns. A Weller Expert Soldering Kit includes everything you need for strong electrical connections.

A Weller Dual Heat Gun is indispensable in electrical soldering. Heat and spotlight come on instantly when trigger is pulled. 2 trigger positions let you switch instantly to low 100-watt or high 140-watt heat. Low heat prevents damage to components and prolongs tip life. High heat is ready when you need it.

Kit includes gun in plastic utility case, 3 tips, tip wrench, flux brush, soldering aid and solder. Model 8200PK $8.95. Weller Electric Corp., Easton, Pa.

Weller®

WORLD LEADER IN SOLDERING TECHNOLOGY

"Put an oil refinery in your car!"
says
TOM McCAHILL
famous automotive expert, test driver and author.

"Detroit tells us their late-model cars need less-frequent oil changes. Which means the filter really has to do a job.

"A Lee Oil Filter does **two** jobs. It removes dirt and neutralizes engine-destroying acids which often form as a by-product of combustion. It's like having an oil refinery in your engine.

"This dual-action purifying process, made possible by LEE's **Resinweld** construction and unique antacid **Feridium** anode, assures better performance, longer life."

LEE
OIL, AIR & FUEL FILTERS

Available wherever you go for your car needs.
Lee Filter Corporation, Edison, New Jersey

Rebinding Damaged Books

(Continued from page 161)

which can be wiped up with a damp cloth.

STEP 18. Return the body of the book carefully to the case. Place waxed paper or foil between the boardpapers and the boards and wrap another sheet around the book. Insert in the grooving jaws of the press and tighten the wingnuts. Tear the foil away from the back of the book and pick out and shape the corners of the cloth with a pointed folder or stick. Leave the book in the press overnight.

STEP 19. Remove the book from the press and separate the case from the body. If the case is stuck along the edges of the back so that the body can't be freed, don't worry about it. The turn-in is trimmed only on the boards. (Don't ever try to trim it across the spine, or you'll cut through the cloth and spoil the case.) Mark the turn-in $\frac{3}{8}$ in. wide around the open edges of each board and trim out with a sharp knife and straightedge. Pull out the excess cloth and discard it.

REPAIRING A TORN PAGE. Lay a piece of foil or waxed paper under the torn page and top it with a piece of cleansing tissue. Using a toothpick, apply library paste to the *edge of the tear only*. Bring the torn edges together and rub with the finger. Lay on a piece of cleansing tissue, topped with foil. Close the book and press overnight. Remove foil and tear away cleansing tissues. Clean off adhering paper fibers with an eraser or razor blade.

STEP 20. Place newspaper under the boardpaper to protect the book and coat the face of the boardpaper with thin glue. Glue the super tab down to the boardpaper, but keep glue out of the groove.

(Please turn to page 222)

Model 65

Don't Buy Batteries
Save $—Recharge Them!

$5.95 factory price

- Charges 6 batteries at once
- Charges *all* types of batteries
- Charges *3 times* faster

You will save real money by using the Everlite battery charger plus the convenience of always having fresh batteries when you need them. You'd have to pay $17.85 for competitive models including all the attachments necessary to even approach Everlite performance—and then you still wouldn't have the power or ability to charge 6 batteries at one time.

TRANSISTOR RADIOS—The Everlite will play all battery powered transistor radios on 115v. house current and at the same time charge the batteries, keeping them in top shape for portable operation. It will also play transistorized tape recorders and phonographs and recharge their batteries in the same way.

Order at once for fast delivery. *FREE* battery tester included with every Everlite. A terrific Xmas gift—highly useful and completely new and different.

Send $5.95 (plus 55¢ postage) for each model 65 Everlite. Send $7.95 (plus 55¢ postage) for each model 66 Everlite Battery Charger including car battery booster kit. Send $1.00 deposit for C.O.D. shipment. Send orders to nearest office.

Always have fresh hot batteries when you need them.

The Everlite is the only battery charger that will recharge all types of dry cell batteries up to 12 volts *including* flashlight (all sizes), lantern, hot-shot, telephone, ni-cad, mercury, hearing aid, radio, tape recorder, toys and camera batteries. The Everlite is so powerful (charges 3 times faster) that with the addition of the model 66 kit it can boost auto batteries to assure fast starts on cold mornings.

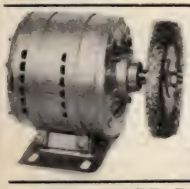
The Everlite is practically non-breakable, simple and foolproof —any child can use it with absolute safety. Plugs into any 115v. AC outlet. Can't overcharge, can't burn out, guaranteed for 1 full year.

EVERLITE* World's THRIFTIEST Light Plants

The Champion — 1200 watts, 115 volts AC for only $139.95.

Unbelievable but true—Brand new production methods now make possible world's finest design in a service free alternator light plant at this unprecedented price. Plant puts out a steady 1200 watts of 115 volt AC power to run power tools, oil burners, pumps, TV, or anything that requires up to 1200 watts. Powered by a rugged 3 HP, 4 cycle, easy start gas engine with 1 year factory warranty. Complete with carry handle and shock mounts. Why fool with short life 2 cycle plants when you can buy this rugged top quality machine at our factory price.
Item #1265—wt. 65 lbs.
The Champion $139.95

® Trade-Mark Registered. Special models for public utilities—Approved for Civil Defense.



⅓ H.P. MOTORIZED WIRE WHEEL

A General Electric ⅓ hp. 3450 rpm motor with arbor and a heavy duty 6" wire wheel for general purpose rust and scale removal. A terrific value priced less than the cost of the motor.
Item 1278.
Wt. 20# $14.75

STANDARD DIAL PHONES WITH BELL

Western Electric and other late model dial phones same as used by all telephone companies. Ideal as extensions on any system. Easy to connect. Several may be connected on one line. Easily modified for private inter-com system. Cost $40.00 new—guaranteed excellent condition.
ITEM 855 NC. Wt. 8 lbs..... **$7.45**

MODERN WALL DIAL PHONE

A modern compact dial phone which hangs on the wall out of the way. Easy to install.
Item #1266. Wt. 8 lbs.. Wall Phone $9.45

Send 10c for 100 page Catalog FREE with order. Prices f.o.b. factory. Money back guarantee.

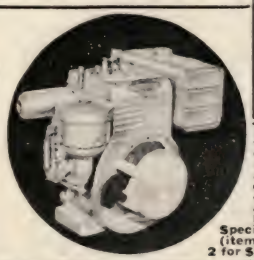
Briggs & Stratton—Clinton New Gas Engine Sale

Never before and perhaps never again—this offer of brand new genuine Clinton and Briggs & Stratton engines including 1 yr. factory warranty at less than cost. Perfect power for scooters, tractors, mowers, generators, pumps, sprayers, etc. We bailed out 3 big factories who needed cash and the savings are yours while quantities last. Act fast.

Clinton 2½ hp. Mdl. 500 — Re-coil starter Std. ⅝ shaft w. keyway—ready to go. Reg. price $49.50
Special (item 1002)
$29.95
2 for $59.50
6 for $176.50

Briggs & Stratton 2 hp. Mdl. 60101 Rope start, std. ⅝ shaft w. keyway. Sturdy 4 cycle power.
Regular price $49.80
Special (item 106a)
$29.75
2 for $58.90
6 for $175.50

$69.95 5¾ hp. Briggs & Stratton

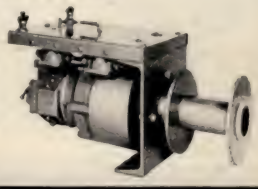


Briggs & Stratton 5¾ hp. Mdl. 143302. Recoil start. Std. 1" shaft w. keyway, and adjustable governor — a rugged big engine ready to tackle any job.
Regular price $92.60
Special (item 1059)... **$69.95**
2 for $135.00. 6 for $375.00

Remember these engines are absolutely perfect and standard and under factory warranty. Money back guarantee. Order now while stocks are complete. Factories—we buy new engines.

TRUCK OR BOAT WINCH 2000#

A powerful compact winch which installs easily even in limited space. Works with any 12, 24 or 32 volt system. Reverses under power—positive brake holds load. Drip proof cover. Remote control if desired. Drum holds 100 ft. of ¼" cable. Speed 30 ft. per minute. A terrific winch at an economy price. Item 1263.
Wt. 55# . . . $59.50



MASTER MECHANIC MFG. CO.

Dept. A-25

Box A, Burlington, Wis.
Box 65, Sarasota, Fla.

Send orders to nearest office.

FREE

NEW CATALOG offers
BIG SAVINGS on . . .

leathercraft

Briefcases Handbags Holsters
Bowling Bags Billfolds
Desk Items
Quivers Saddles & Accessories Moccasins
Belts

in easy-to-make kits direct from the nation's largest leathercraft supplier

SAVE OVER ½ OFF FINISHED VALUE

over 120 different easy-to-assemble leathercraft kits available!

Surprise Your Friends,

and relatives by making handsome genuine leather items. Earn extra money, too! Big catalog shows over 120 easy-to-assemble leather kits. Make $30 handbags for less than $10. $10 wallets cost less than $3. $200 saddles cost less than $110. Plus over 117 other fabulous money-making items!

FREE BONUS OFFER

included with your FREE catalog

It's fun and profitable working with leather. We furnish you complete instructions.

FREE catalog plus details on valuable FREE bonus offer

Tandy LEATHER COMPANY

MAIL COUPON TODAY!

Tandy Leather Co.
1001 Foch St.—Dept. HF
Fort Worth, Texas

Please send catalog and **FREE** bonus details

NAME_____

ADDRESS_____

CITY_____ STATE_____ ZIP CODE_____

Rebinding Damaged Books

(Continued from page 220)

Close the cover on boardpaper, then open and rub the boardpaper down with your fingers. Withdraw the newspaper, replace it with waxed paper or foil and close the cover, then glue the second boardpaper.

The book is now ready for a final pressing. Be sure to have waxed paper or foil between both boards and the book to prevent moisture from soaking through. Wrap waxed paper around the book and place it in the grooving jaws of press.

The title can be handlettered, typed, or printed if a small handpress is available,

REPAIRING A TORN HINGE. Where one or both boards are pulled away from the body of the book, cut the board free from the body of the book and lay it back. Then glue a strip of super to the spine (with flexible glue) covering its full width, plus about ¾ in. to form the new hinge. Glue a strip of newspaper backing over the super. Cut a strip of Kraft paper 1¼ in. wide and as long as the page. Fold over ¼ in. along one edge, paste this to the flyleaf and rub it down. When dry, apply paste or hard hide glue to the strip, as shown in the photo, fold the super over it and rub down. Close the board on the book with waxed paper under the Kraft strip and press between the grooving jaws for 24 hrs.

on a piece of colored artpaper. Glue the title to the back of the book and leave book in press at least 24 hrs.

To avoid breaking the back when the rebound book is opened, open it this way: Stand book on spine and let covers fall open. Open the book a few sheets at a time, a few at front, and rub them down in the groove; a few at the end, and rub them down. Continue thus until the middle of the book is reached. ★★★

Why our engineers insist on a 3-speed automatic transmission while many competing cars offer only two.

Why does Ford's optional automatic transmission give you three speeds when our major competition continues to offer only two speeds for just about the same price?

We do it because our 3-speed Cruise-O-Matic unit is smoother, livelier, and more economical than 2-speed automatics.

The Ford 3-speed transmission gives you a choice of starting gears—one for normal driving and another for gentler starts on ice, snow, or other slippery surfaces. We give you a middle gear to take over in the vital 40-to-65 miles-per-hour passing range (right where the 2-speeders bog down).

And the Ford Cruise-O-Matic transmission actually saves you money on gas. That's because, with three gear ratios to call on, your engine is more efficient in every speed range. With engine speeds kept down, the Ford is smoother, quieter, more economical.

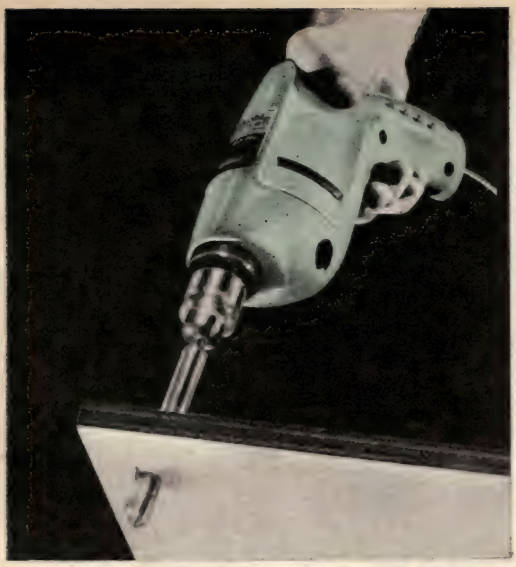
Drive this new 3-speed automatic. It's available on every 1965 Ford car—optional on Falcons, Mustangs, and Fairlanes . . . standard equipment on Ford Galaxie XL and LTD models, and on Thunderbird. You'll notice a measurable difference in smoothness, acceleration, response. And that's what a Ford is all about.

Best year yet to go Ford!
Test Drive
Total Performance '65

FORD

MUSTANG · FALCON · FAIRLANE
FORD · THUNDERBIRD

THE TOTAL PERFORMANCE FORD GALAXIE 500 2-DOOR HARDTOP



The safest, toughest ¼" drill made!

NEW from Porter-Cable—these tools are:

Shockproof—Constructed of non-conductive CYCOLAC—double insulated against electrical shock to conform with all Electrical Safety Codes.

Breakproof—New CYCOLAC housing guaranteed against breakage, forever!

Failure-Proof—High-temperature insulated motor will not burn out from overload.

¼" Drill Model 50/2.3 Amp. (.22 HP) Motor/2250 RPM Also available—⅜" Drill, Jig Saw, Sander and Kits

THE NEW TOOLS ARE ROCKWELL-BUILT

Rockwell Manufacturing Company, Power Tool Div.
502B N. Lexington Avenue, Pittsburgh, Pa. 15208

Send me ☐ literature ☐ dealer's name

Name_____

Address_____

City_____ State_____ Zip_____

Rockwell
MANUFACTURING COMPANY

Buy the Green Line for safety.

Engine Analyzers

(Continued from page 183)

been filed as mentioned before so they have sharp corners. Round corners could give a "bad" indication, even with a plug that's in good condition.

- Make sure the plug insulator is clean and dry.
- Check the operation of a *new* spark plug, gapped the same as yours, in the tester first. Note the pressure at which the plug no longer fires.
- Now, check the pressure at which your reconditioned plug no longer fires. If the difference between the two does not exceed 30 percent, the reconditioned plug is suitable for reuse.

There's one other aspect of this testing procedure you should be aware of. Many plugs when checked in a pressure-type tester are condemned because of voltage flashover—that is, sparking from the plug terminal down the insulator, to ground on the shell. Flashover doesn't indicate a faulty plug. As a matter of fact, it proves the plug insulator's in good condition and signifies that the plug has no cracks or pinholes that could cause misfire. The only time flashover means trouble is when it's occurring through a *visible* crack in the insulator. And you probably would have spotted this crack before now and discarded the plug.

Furthermore, don't be concerned by "corona"—a glow that sometimes appears above the shell around the base of the insulator, especially if you operate the tester in a dark corner. It's caused by electrical stress in the air around the insulator, and is not harmful to plug operation.

When replacing discarded plugs, make sure you get ones of the correct heat range. These are not always the ones spelled out in the specifications for your engine, since they vary with driving conditions. However, the plug recommended for your engine is a good place to start. If you experience trouble with these, as pointed out in the chart, then you can switch to a hotter or colder type.

Plug heat range refers to the ability of a plug to transfer its heat from the firing tip to the cooling system. Plugs might have identical electrode configurations and be of the same size, but could be different in that they transfer heat at a slower or faster rate. This rate of transfer is controlled by the distance the heat must travel to reach the cooling agent, as shown in the drawing on page 183.

"Cold" plugs have relatively short insulator noses and transfer heat rapidly. These are generally recommended if a

car's normally driven under heavy duty and/or continuous high-speed conditions.

"Hot" plugs have longer insulator noses and transfer heat more slowly. By running hotter they burn off combustion deposits that might tend to foul the plugs during prolonged idle and low-speed driving. Keep in mind that a "hot" plug does *not* produce a hotter spark than a cold plug.

Installing Plugs. There's a definite science to installing spark plugs in modern automobile engines, say engineers at AC Spark Plug. Careless installation can cause a plug to overheat, strip the threads of the plug or cylinder hole, break the insulator or damage the shell.

Here's the right way to do it:

1. Make sure cylinder head threads and plug seats are clean and free of dirt and deposits that could interfere with proper seating. Cylinder head threads should be cleaned with a greased thread-chaser of the correct size. Clean plug threads with a wire hand brush, but be careful not to hit the electrodes or insulator tip.

2. Always check the gap setting, even of new plugs. The same type plug may fit a dozen different cars, so factory gap settings will not be right for all cars.

3. Always install new gaskets (except with plugs that don't require any gaskets). Screw the gasket up on to the plug threads finger-tight.

4. If possible, use a torque wrench to tighten the plugs. Suggested torque values:

Spark Plug Thread	*Cast Iron Heads*	*Aluminum Heads*
10 mm.	12 lbs. feet	10 lbs. feet
14 mm.	25 lbs. feet	22 lbs. feet
18 mm.	30 lbs. feet	25 lbs. feet
⅞ mm.	35 lbs. feet	30 lbs. feet
18 mm. taper seat	17 lbs. feet	———

5. If a torque wrench isn't available, screw the plug into the cylinder finger-tight. Then tighten an additional ½ to ¾ of a turn with a socket wrench.

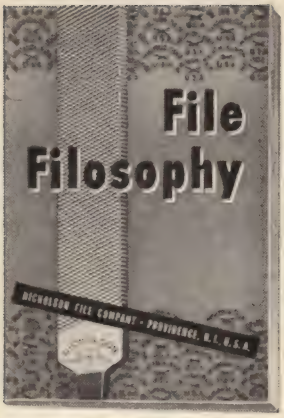
6. Check the condition of spark plug wires and boots. Dried-out or cracked wires and bad boots could lead to a plug failure. They should be replaced. ★★★

The Air Force is trying to find out how risky it is for a pilot to take an aspirin or a common cold remedy before flying. The School of Aerospace Medicine salvaged a scrapped B-47 trainer and will use it in the research. The subject will fly a simulated mission as is, then take medicines and fly it again. Medics will check his reaction times, judgment, etc.

No
Ordinary Oil Filter
Can Protect a Car's Engine for the 6,000 Mile Oil Change Interval Specified by Car Factories . . . WIX Multi-Cel Filters Can and . . . . . Do!

Whether you drive a car, truck or tractor go to the dealer who gives you your money's worth . . . the man who sells WIX Oil, Air and Fuel Filters. Get the extra bonus miles of filtering performance . . . you'll notice the difference with WIX, in improved mileage and reduced engine wear.

WIX® FILTERS
WIX CORPORATION • GASTONIA, N. C.
THE GOLD STANDARD IN FILTRATION



If you never use a file, you don't need this book

But we're pretty sure you do, so we're offering FILE FILOSOPHY, free, to anyone who fills in the coupon.

You get a booklet that's filled from cover to cover with facts on filing—30 chapters to be exact, over 120 illustrations to be almost exact. Everything from how to select a file to how to care for one.

NICHOLSON FILE COMPANY
Dept. PM2, Providence, Rhode Island 02904

Gentlemen: Please send me a free copy of FILE FILOSOPHY.

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP CODE _____

NICHOLSON® U.S.A. NICHOLSON BLACK DIAMOND® U.S.A.

Files · Rotary Burs · Hacksaw and Band Saw Blades
Hole Saws · Ground Flat Stock · Industrial Hammers

Guide to Shortwave Receivers

(Continued from page 120)

signal you are trying to receive.

Beat-frequency oscillator (BFO). Most shortwave radios have this oscillator which is triggered by code signals you may want to tune in. The BFO keeps the pitch of code signals you receive constant. But receivers that have a BFO should include a variable pitch control so you can select both the most pleasing tone and one which can be most readily distinguished from background noise.

Preselector. Only better receivers include this extra tunable r.f. amplifier in front of the other receiver circuits. It helps bring in weak, hard-to-hear stations. To check its effectiveness, tune to a weak station on a set *without* a preselector and compare reception of the same station on a set *with* a preselector.

Variable selectivity of the i.f. (intermediate frequency) circuits is quite popular. One version of this circuit, called a Q-multiplier, lets you narrow the range of frequencies your receiver is amplifying. This helps separate crowded stations. Test by tuning to a crowded portion of some shortwave band, and seeing how many different stations you can get both using the Q-multiplier and with it off. Some Q-multipliers are more effective than others.

On some of the most expensive sets variable selectivity circuits include crystal filters to give really sharp narrow bandwidth.

Calibrator (CAL). On some receivers this circuit is built-in. It produces audible tones at precise frequencies, so you can zero the set's dial tuning indicator to conform exactly to the specific frequency it indicates. Make sure the dial itself can be easily adjusted. If you want even more tuning precision, your set should have a crystal type calibration circuit, which cannot drift off frequency. The crystal calibrator is also available as an accessory you can add later.

Bandspread. The ratio of how far you have to turn the tuning knob to how far the dial moves determines how finely you can tune to a station. Generally speaking, the more expensive the set, the higher the tuning ratio. But make sure the tuning control moves smoothly and easily.

How many bands? Most all-wave sets cover all frequencies between 550-kc. and about 34-mc. (Some special sets cover other frequencies.) But within the normal frequency limits, a set divides its range into a number of bands, usually four, five, or six. The more bands there are, the finer the tuning and the easier it will be to select stations. ★★★

FREE!...Send Today

World's Largest Electronic Kit Catalog

Save 50% on:

Electronic Organs
Color TV
Stereo/Hi-Fi
Shortwave
Automotive
Amateur Radio
Citizen's Band
Education
Photography
Lab & Test
Marine

Over 250 Easy-To-Build Kits

Over 250 ways to add better quality and more fun to your hobby or profession . . . and save up to 50%! Convenient time-payment plan. Free help from our technical correspondents. Find out why Heath is the world's largest manufacturer of quality electronic kits. Send for your FREE 1965 Heathkit Catalog now!

HEATHKIT

HEATH COMPANY, Dept. 17-2
Benton Harbor, Michigan 49023
In Canada: Daystrom, Ltd., Cooksville, Ontario

☐ Please send Free 1965 Heathkit Catalog.

Name_____
(Please Print)

Address_____

City_____ State_____ Zip_____

Prices & specifications subject to change without notice. CL-202

World of Automatic Tires

(Continued from page 137)

buildup, thereby reducing both mileage and safety, particularly at high speeds.

Design—Second Vital Factor

The way the rubber and cord are put together—the tire's design—is always a compromise. What helps one performance characteristic hurts another. A softer ride can be built into a tire, for example, either by using a more cushiony blend of rubbers, or a higher cord angle. But a softer rubber may wear more quickly. And the higher angle can let the tire flex more, producing tire-killing heat. It also reduces steering response and cornering ability.

Tire engineers, constantly juggling ingredients and design features, continue to come up with innovations. The two-ply tire is one of the best-known examples.

For many years, most passenger car tires used cotton cord, at least six plys—or layers—for enough strength. With rayon and nylon, the four-ply tire became practical. In recent years, manufacturers have increased the strength of cords still further and built two-ply tires. In these so-called two-ply, four-ply-rating tires, each individual cord is about twice as strong as those used in four-ply tires, so half as many give nearly the same total strength, and almost the same resistance to blowouts, cuts, punctures, and sidewalk bruises.

And two-plies' thinner construction generates less heat, yet flexes more for a softer ride and bigger "footprint," hence better traction and skid resistance.

While the somewhat poorer performance of the earlier two-plies—particularly their tendency toward ply separation—gave them a bad name at first, most of the difficulty seems to have been overcome, and at least 19 out of 20 new cars this year will use them.

Low Profiles Squirm Less

What about the low-profile tire making its appearance on most cars this year? (It was on Lincoln Continental and Thunderbird last year.) On this tire the cord angle (the angle at which the individual cords cross the tread) is lower, down from an average of about 37 or 38 degrees to near 33 or 34. This makes the tire firmer and steadier. It squirms less on the road, so tread wear is improved as much as five percent. The stiffer, more stable tire also gives better cornering and steering response and has better high-speed characteristics. The new tire also has rounded shoulders. When it heels over in a hard turn, an extra tread groove comes in contact with the ground for better traction.

Of course, the better performance of the low profiles didn't come free. The lower angle brings with it a slightly harsher ride. The designer steals back a little softness with two-ply construction. And better auto suspensions give a smoother ride despite the slightly harsher tire.

The Radical Radials

Far more radical than either the two-ply or the low-profile is another design just now appearing on the American market: the so-called radial-ply tire! The cords don't angle across the tire's tread in the usual crisscross pattern at all, but are laid straight across from bead to bead, at a 90-degree angle. Then a multi-layered belt fits like a hoop around the tire's rolling surface. The new doughnut, says P. W. Perdriau, president of Goodrich, "rolls as easily as a hoop. It is soft in the sidewalls where a tire should be soft, and rigid in the tread where a tire should be rigid."

"The belt lays the tread on the road without the twisting and squirming that occurs when the cord angles of a conventional tire change, scissorslike, under load," says J. J. Hartz of Goodyear. "This free-rolling tread lasts much longer and, because it has less rolling resistance, fuel economy is improved."

More Miles per Gallon

John Antonson of Goodrich's advanced tire development department estimates potential gas savings at up to 12 percent. Among other benefits are better skid resistance, traction, and handling, and improved cornering and steering. At high slip angles—such as in panic turns—cornering may be improved as much as 30 percent. Radials also have better resistance to impact and penetration.

The radial tire also gets around a big weakness of glass cord. "In a radial-ply tire," says Firestone's Wolf, "you don't get compressive distortion. The cords are always under tension."

With all its advantages, the radial tire may have a hard time being widely accepted. Main drawback: a rough ride at slow speeds. "If you roll over a pencil," says one tire engineer, "you know it." Despite its ride, sports car fans will buy it—as they do in Europe—for its performance and economy. Some U.S. owners of foreign cars use imported radial tires now, principally the French Michelin "X" and Pirelli Cinturato. The belt around the Michelin's tread, incidentally, is made of woven steel wires, as is the band around the Goodrich radial. Goodyear offers either steel or rayon in Europe, but prob-

(Please turn to page 232)

SURPLUS SALE

GOVT. SURPLUS EXCESS INVENTORY BANKRUPT STOCK

HYDRAULIC SURPLUS BARGAINS

- Great savings. Build loaders, diggers, presses, etc. Brand new equipment.
- $20 Hyd. Cyl. 1½" x 6" stroke . . . $ 9.39
- $69 Pump with Reservoir $17.49
- $175 Motor Driven 12-v Hyd. Pump $18.49
- $42 Hand Hydraulic Pump $11.95
- $39 Hyd. Cyl. 3" x 8" 2-way $19.95
- Hyd. 2-way 1000 lb. Valve $19.00

BATTERY ELECTRIC WINCH

• Item ±318. Geared powerful motor unit, drum capacity to 150 ft. of ¼" cable. 12-v battery. Capacity 2000 lbs. Reversing switch on winch. Use on jeeps, trucks, trailers, etc. Size 10"x9"x7". Wt. 65 lbs. Gov't cost over $300. SALE $59.95

AIR COMPRESSOR EQUIPMENT

• Make your own outfit. For painting, tires, shop use, etc. Save to 60%. • Compressor $19.95. Govt. Tank. $11.95. Gauge, $1.75. Paint Gun, $10.50. Auto switch, $4.35. Air Regulator, $3.95. Air Filter, $3.75.

DIAL TELEPHONE

• Item ±716. Std. phone, same used on all phone systems. Use as extension to main phone and on private systems. Directions furnished. Wt. 8 lbs. Cost $25 SALE $7.95

AC-DC ELECTRIC GENERATOR

• Item ±675. New Govt. unit. Generates 115-v (800 cycle) AC (1200-w) and 30-v up to 200 amps DC. • Use for 115-v AC lights or stove or for DS 200-amp welder. Size 14"x8"x6". Wt. 55 lbs. Cost over $250. SALE $15.85

EXAMPLE BARGAINS IN CATALOGS

- $270 Geared 12-volt 2 h.p. Motor . . $19.89
- $31 Hispeed ½ h.p. DC 12-v Motor . $ 3.97
- $90 Selsyn 115-v 60-C Motors (pair) . $ 7.91
- $45 Vari Volt Transformer AC . . . . $ 2.39
- $99 Jeep Capstan Winch $33.95
- $75 Gov't Centrif Pump 1½" Outlet $23.81
- $35 Electric Time Switch 115-volt . . $ 8.91
- $75 Automatic Motor Keying Unit . . $ 3.95
- $231 Relay Control Unit-20 Relays . . $ 4.95

SPECIAL OF THE MONTH!

BUILD LOW COST ELECTRIC AUTO

• Item ±572-A. Build real electric auto or golf car. Powerful, quiet. Run on 12-v car battery. Use new Gov't ball bearing gear reduction motor, 1½ h.p., 60 to 1 ratio. 200 r.p.m. • We sell motor only. Data on cars furnished with motor. Size 6" x 18". Wt. 40 lb. Gov't cost $291 . . . . . Sale $27.86

Send 25¢ stamps for THREE War Surplus Mechanical-Electrical Catalogs

All items FOB LINCOLN

SURPLUS CENTER

DEPT. PM25, LINCOLN, NEBR.

CUT-TO-FIT HOMES SAVE LABOR COSTS UP TO 100%

Save labor cost up to 100%, reducing completed home cost. You can assemble any of 57 designs from easy-to-follow plans. No measuring or cutting . . . every piece precision machine pre-cut and marked. **BUY DIRECT FROM MILL.** Eliminate all between overhead, profit and labor costs. Nothing to plan or figure. Complete with all lumber, hardware, paint, nails, glass, roofing, etc. Sterling Home quality material throughout. Freight paid most areas. Write today. Send 25c for illustrated, color catalog, floor plans and details.

CHOICE OF 57 DESIGNS

PRICED FROM $2295 UP

Prices do not include carpentry labor, heating, lighting, plumbing and masonry materials.

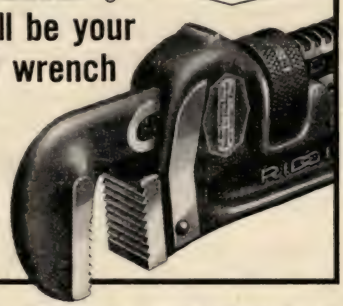
FIVE EASY-PAYMENT PLANS,

THIS HOME $6535

INTERNATIONAL MILL & TIMBER CO. Bay City, Michigan, DEPT. PM25

Even without this famous guarantee a RIDGID would still be your best pipe wrench buy.

UNCONDITIONAL GUARANTEE
If this Housing ever Breaks or Distorts we will replace it Free
THE RIDGE TOOL CO. ELYRIA, O.



Choice of 10 Sizes 6" through 60"

RIDGID Heavy-Duty pipe wrenches are tough. That's the way we build them. And that's why they'll outperform and outlast all others. Jaws are made of tough, alloy tool-steel. Patented spring jaw suspension gives instant, slip-proof grip. Jaws can't lock . . . always release fast. Every RIDGID Wrench is completely work-tested before shipment. Try one and you'll be sold on a RIDGID.

See the complete line of RIDGID Work-Saver Tools at your dealers

RIDGID® THE RIDGE TOOL COMPANY, ELYRIA, OHIO, U.S.A.

New Low-Cost, High-Performance Diamond Blade!

SAWS ALMOST ANYTHING NON-METALLIC . . . CUTS GEM STONES, GLASS, TILE, BRICK & CLAY PRODUCTS, CONCRETE, TRANSITE, ALL SIMILAR HARD, BRITTLE NON-METALLIC MATERIALS!

New GOLDEN RIMLOCK*

out-cuts, out-lasts all other blades of its type.

SEND FOR TRIAL GOLDEN RIMLOCK TODAY!

FELKER DI-MET SINCE 1929

FELKER MANUFACTURING CO.

1900-K So. Crenshaw Blvd.
Torrance, California 90501

World's Oldest and Largest Manufacturer of Diamond and Abrasive Blades and Machines.

6" x .032" $11.40; 8" x .040" $16.80; 10" x .040" $21.90
California sales add 4% Sales Tax

Send C.O.D. ☐, or Check ☐, Money Order ☐ enclosed.

Name _____

Address _____

City _____ State _____ Zip Code _____

*TRADEMARK

World of Automatic Tires

(Continued from page 230)

ably will go with the smoother riding rayon in this country. (Nylon, incidentally, is out here: too stretchy.)

Which Line Should You Buy?

While tire quality varies from one brand to another, the various levels (premium, first, second or third line and promotional) tend to fall into certain broad categories. Here, generally, is what your tire dollar buys in the various levels, and where the individual levels work best:

Premium tires offer two things: extra-heavy construction and special features like an inner tire to let you keep driving after a flat or like an internal puncture sealant. One premium—the butyl tire—gives a ride as smooth as a cat licking butter. And it won't squeal. It doesn't, however, give long mileage. The radial tire, with its souped-up characteristics, is another premium.

For long tread life, extreme strength and safety, tremendous resistance to abuse, and special features—all at a price—the premium tire is a good value.

First-line tires are either those made by one of the original equipment (OE) makers—Firestone, General, Goodrich, Goodyear and U.S. Rubber—for factory installation on a new car, or by none-OE makers to compete with OE tires. They have engineered into them, especially if they're made by an OE company, a lot of the soft ride that car builders demand. "We get an envelope from Detroit every morning," says Firestone senior engineer Jim Corey. "This or that manufacturer says the noise level is unsatisfactory or the tire doesn't corner quite as well as they'd like. So we keep working until we meet their requirements."

While first-line tires also give better tread life than cheaper tires, a good bit of their cost buys what tire men call "aesthetics": ride and quietness. If these aren't important to you, you may get more miles per dollar with cheaper tires. (Since nylon-cord counterparts of OEs sell for a couple of bucks extra, some makers call them premiums.)

Under extreme conditions—off-the-road driving, for example—the extra strength built into first-line or even premium tires might be worth the extra cost on that basis alone. If you want low-profile tires, you'll have to buy first-lines. Eventually they should be available in other lines, but not yet.

Second- and third-line tires are hard to separate. They're both good general-purpose tires with few frills or extras. One is a little stronger, a little longer lasting, a little more expensive. They're also the most misunderstood tires.

"Second- and third-line tires," says Firestone's Corey, "are designed for a special market. Why should the man who is only driving back and forth to work invest in an expensive tire when he can buy one at a lower price that does the same job? The differences between second- and third-line tires and the more expensive lines are primarily matters of tread wear, noise, appearance, and handling. To go to extremes, when you get into very high speeds the second-line tire will run faster without breaking up than the premiums or first-lines. (But it will, of course, wear out faster than more expensive tires.) The first-line's light construction makes it cool running so it takes speed well. And all of our tires are tested at 100 miles an hour, so they're safe.

"They may or may not be the best buys from the point of economy. At moderate speeds, our second-line tire gets about 90 percent of the mileage of the first-line; the third-line about 80 percent." Since second- and third-line tires cost about 75 and 65 percent of the first-line price, they're obviously a better miles-per-dollar buy.

"When speed is introduced, though," continues Corey, "a second- or third-line tire won't wear as long as it will at slower speeds. The tread doesn't have the wear resistance that the first-line does, and that difference is magnified with speed. So for the guy who does a lot of turnpike driving, the first-line tire is probably more economical."

Promotional tires are the cheapest ones the tire makers can put together and still meet reasonable standards—including the new safety standards.

Properly used and maintained, promotional tires are relatively safe. But of course, they can't take the abuse—such as occasional overloading—that stronger, sturdier, more expensive tires might shrug off.

Most manufacturers agree with these general rules for picking the right grade of tire, but some take vigorous exception. Harry C. McCreary, Jr., Chairman of McCreary Tire, is the most outspoken. "The manufacturers who make the second, third, and fourth line 'promotional' tires (we don't) are prone to making pious statements to the effect that each of their particular grades of tires are perfectly safe 'when used as the manufacturer intended.' The problem is that the manufacturer's intentions and the consumer's intentions are sometimes 180° apart and this is how people get killed."

Lower priced tires, says McCreary, don't have a large enough safety margin, and are likely to be overloaded in normal use. "How are you going to prevent the consumer from buying a cheap tire, loading the wife, kids, dog, and baggage into the car and then taking off down the freeway at high speed?" McCreary's suggestion: Remove all but the best tires from the market.

While such a plan would certainly make the highways safer it's not likely to happen. And no tire is safe or will deliver the mileage and performance built into it unless properly used, regularly inspected, and properly inflated. ★★★

It's a Long, Long Day on Venus

Venus rotates on its axis once every 248 to 258 earth days, astronomers have measured, achieving an accuracy five times greater than the previous most accurate study. Earlier the rotation period was estimated between 239 and 293 earth days.

Using the world's largest radio-radar telescope at Arecibo, Puerto Rico, Cornell University astronomers also confirmed the previously reported observation that Venus rotates in the opposite direction from that of the earth and most other planets in the solar system.

The findings were gained through the use of radar astronomy, which involves bouncing a radar pulse beam off the surface of a planet and studying its return reflection. The frequency with which a planet turns each "side" to the sun has a great effect on the temperatures and winds in its various regions.

Ultrasonics for Mentally Ill

Some types of mental illness are now being helped by ultrasound waves of a million cycles per second which disrupt certain nerve pathways in the brain. Called PST (Prefrontal Sonic Treatment), the method works well with patients suffering from feelings of anxiety, depression and compulsion. But it doesn't help patients with personality disorders, severe social maladjustments or other chronic mental illnesses.

The technique was developed by Dr. Petter Lindstrom of the University of Utah College of Medicine as a substitute for frontal lobotomy operations in which portions of the brain are severed or removed. The treatment is said to be "relatively painless."

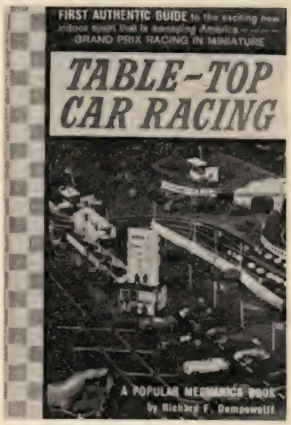
Need New Furniture?

Look in Your Attic

The Popular Mechanics Home Book of Refinishing Furniture—$4.95

Popular Mechanics Book Dept.
575 Lexington Avenue
New York, N.Y. 10022

TABLE-TOP CAR RACING



A Popular Mechanics book tells how the fun started . . . how you can build the scale model cars, realistic track and scenery . . . and how to race these free wheeling little cars in a wide variety of scale sizes.
It is all here including a list of manufacturers of parts and components.
$4.95 plus postage. Popular Mechanics Books, 575 Lexington Ave., New York, N.Y. 10022

$7 a Year Heats Solar House

(Continued from page 93)

ferentials under all conditions of weather I have learned that this reflector increased the output of my heat trap by as much as 30 percent.

As the lengthy testing proceeded, I found that I could sometimes heat water to the boiling point. If no water were being circulated through the heat trap, the temperature would go as high as 250 to 275 degrees Fahrenheit on hot summer days.

Now I went to work on the airconditioner. By circulating water from the tank over the north roof of the house at night, I chilled it through the process of radiation, evaporation, and contact with the cool night air. The cooled water in the tank chilled the stones around it. The next day, when the rooms needed cooling, I circulated air through the cooled rock bin and back into the rooms.

I was aware that airconditioning engineers recommended that home temperature be lowered only 10 to 15 degrees below that outside the house. Therefore I was pleased when my solar machinery reduced the interior temperature of my house as much as 15 degrees below the exterior temperature. But that was only under ideal conditions. The rooftop cooling wasn't always that effective. Consequently in an alternative system I have used a ¾ hp. refrigerating unit to chill the water and stones at night as a means of storing coolness for the following day.

Although these facts were encouraging, they did not answer the vital question of practicality. Would my system actually save money for the householder?

The answer to this depended, to a considerable extent, upon the quantity of heat in the heat bin, and the cost of doing it all.

During the early winter of 1959-60, I sought the answers as one cold, cloudy day succeeded another. I kept close watch as my stored heat reserve dwindled. Some systems, I knew, could not keep the house warm if the stored heat level dropped below 90 degrees Fahrenheit.

When the heat level of my reserve dropped to 90, I was understandably anxious. Obligingly, however my house remained comfortably warm.

But the cloudy weather continued. The stored heat level dropped to 85, 80, 75, and even lower. Even so, the interior temperature of my house remained close to 70.

At last, however, the house temperature dropped noticeably below 70 degrees. Then the auxiliary oil heater—which I had provided for just such long, cold, cloudy spells—cut on automatically to assist the solar heat. On the day after Christmas, the Washington *Star* reported: "Mr. Thomason spends 30 cents for fuel so far this year."

That statement was true. We had used two gallons of fuel oil by that time. By the end of the long, cold, half-cloudy winter my fuel bill was only $4.65. I had used 31 gallons of oil at 15 cents a gallon!

For three consecutive years I have heated a six room house in Washington, D.C. for the grand total of $18.90. This averages $6.30 a year. Airconditioning bills were reduced about 40 percent. According to the best estimates I can arrive at, it would cost about $100 to $150 a year to heat this some house with oil.

What about the cost of original equipment?

It cost about $2000—roughly twice the price of an oil-fired hot air system. It promises to give long life. The few elements which must be replaced after five years or so are inexpensive and simple to install.

Since that first house went up in 1959, we have built two more. House number two, erected in 1960, had an outdoor swimming pool. The water in it was warmed by the solar heating system until snowfall. Our auxiliary heat in that one cost about $35 a year. There were two reasons for this. First, the fuel was electricity—about three times the cost of oil in our area. Second, the collector was much smaller—560 square feet instead of the 840 in house number one.

Our newest solar house—still not completely finished—is the last word in Thomason design. While the first two were built strictly with a view to functional efficiency, this time we have endeavored to incorporate the huge, 940-square-foot collector into the architectural design of the house. A large indoor swimming pool, heated by the solar system, is an integral part of the building. As yet we have no figures on this one. But we have high hopes of spectacular results.

It is my firm belief that our own experiences, and those of others, presage a dramatic increase in solar heated homes. Many top solar authorities agree with this. In fact, I have read one published prediction that, by 1975, there will be a total of 13 million solar heated homes in the United States.

That estimate may be too high. But, if Congress authorizes the Secretary of the Interior to establish a Solar Energy Commission, as provided by the Honorable Hubert Humphrey's Bill S. 2853, this *could* well become a reality.

Whether it does or does not, it is my opinion that solar heat for homes is not only practical—it's good business! ★★★

$1050 GROSS IN SINGLE MONTH IN MY OWN BUSINESS

F. E. DORAN reports

Some make more, some less...

START YOUR OWN BUSINESS NOW! • Here's YOUR chance to start a money-making, year 'round business of your own and make the success you've dreamed about.

G. R. Adcock took in $102 in one day. O. W. Hare landed a $750 hotel job. J. S. Corbit grossed $279.50 his first month. Homes, hotels, offices, clubs, offer you big profit possibilities. Auto upholstering also.

NO SHOP NECESSARY • You clean upholstered furniture with efficient PORTABLE ELECTRIC DETERGER on customer's premises. No hauling, no high rents; you operate from your home. Supplies cost little; what you take in is mostly profit.

Ours Is NOT a Lease Arrangement • You are free to operate in an independent manner. You sign no contract. You own the deterger outright and are always your own boss...and every dollar you take in is yours to keep...you pay no fees, or dues, or royalties to anyone, and enough supplies come with it to return far more than your investment. Many earn the cost of the deterger in a week or two.

It costs nothing to get the details...write TODAY!

MAIL COUPON TODAY FOR FREE BOOK

VON SCHRADER MFG. CO.
210 "D" Pl., Racine, Wisconsin

Without obligation rush your **FREE** booklet about how I can start my own permanent, profitable electric Upholstery Cleaning business.

Name_____

Address_____

City_____ Zone____ State_____

Speedy Sprayer

7 times faster than brushing!

Does an hour's work in minutes! Paints anything from toy to house. Pays for itself with the first big job. A professional sprayer for the amateur!

Speedy Sprayer "Compact No. 404"

only **$39.95**

Slightly higher Denver West.

Write for "How to Spray" booklet and catalog.

W. R. BROWN CORP.
2701 N. Normandy Ave., Chicago, Ill. 60635

POWER-SAW OWNERS!

NOW CUT *ACCURATE* DADOES, GROOVES, SLOTS, TENONS, JOINTS, RABBETS, LAPS, HALF-LAPS, TONGUE-AND-GROOVES, *and more EASILY!*

QUICK-SET DADO Cutter

Dial any width, right on saw!

Use on radial-arm or table saws!

Not like other dadoes! A top-quality tool made and guaranteed by COMET, the famous saw maker. Approved for schools, shops, home workshops.

Cuts any width, ¼" to 13/16ths. **Infinitely variable.** Cuts ¾" deep. Indispensable for shelves, cabinets, drawers, all kinds of furniture. **$19.95 postpaid. Moneyback guarantee.**

FREE *DADO MAGIC BOOK* **MAIL COUPON TODAY**

COMET INDUSTRIES CORP. Dept ED-2B
2000 Imperial Street, Los Angeles 21, Calif.

Send coupon today for free book loaded with useful dado info. Every workshop should have a copy. No obligation. ☐ **Send FREE book DADO MAGIC**

☐ **Send Quick-Set Dado. ($19.95 enclosed)**

Name_____

Address_____

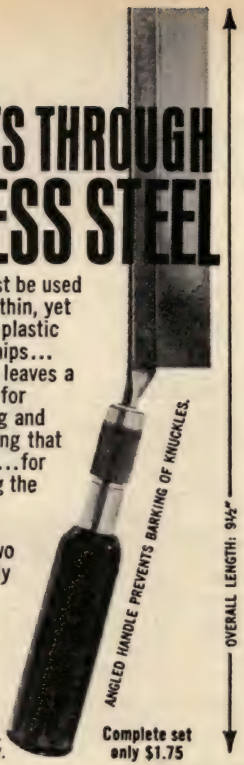
City_____ State_____ Zip #_____

THIN AS A RAZOR BLADE

YET IT CUTS THROUGH STAINLESS STEEL

Here is a saw that must be used to be believed. Razor-thin, yet it cuts through wood, plastic and metal. It never chips... never splits...always leaves a smooth edge. Perfect for precision cross-cutting and notching...for trimming that extra ⅛th of an inch...for sawing smoothly along the grain. Another quality tool from X-Acto. The Razor Saw with two different blades...only $1.75. Refill blades always available. See the Razor Saw at all better hardware or homecraft stores or order directly from:

X-ACTO PRECISION TOOLS, INC.
48-41 Van Dam St., Dept. R-8, L.I.C.1, N.Y.



Complete set only $1.75

IDEAL 900
Lawnmower Sharpener

"Two-Way" Grinding Option means bigger profits for you!

The Ideal sharpens *any* reel-type mower by either "Hook" or "Straight-Line" methods. No limitations, every job perfect with no hand filing. Ruggedly built, screw adjustments can't slip, ½ hp. motor. Write for Full Details.

The Fate-Root-Heath Co., Dept. PM-2, Plymouth, Ohio

Owner's Report—Chevrolet

(Continued from page 98)

—Ohio electrician.

"Power steering is out of this world; I can turn around on a dime with my little finger."—New York mechanic.

"I like this power steering; I've had Chrysler products where you couldn't turn your head or the wheel would turn."—Ohio secretary.

Chrysler's was "full-time power steering." This year the pull you put on the wheel rim before Chevy power comes on is down from about 8 pounds to about 3.

"The car holds the road well; it seems heavy."—Illinois construction worker.

"There's good handling on turns because of the wide track and heavy-duty suspension I ordered."—Nebraska salesman.

We suspect the optional suspension deserves more credit than the wide track.

Returning to the complaint side, here are samples of numbers six through ten with the most widespread listed first:

"Curved windows aren't as strong and tight fitting as the old ones. They have slight leaks and wind is always whistling at the tops."—Louisiana bookkeeper.

"The windows do not roll up and down well. I see no reason for curved glass in the doors."—Tennessee insurance agent.

Chevrolet trouble with curved glass started when their curved side windows did, in Chevelle. It should be over by now.

"The paint job is poor. Paint quality on all cars is getting worse each year."—Illinois accountant.

The factory is proud of its re-heat system, says it re-liquifies the paint surface after sanding so imperfections smooth out. Maybe it doesn't always work.

"I thought the small V8 would use less gas than the '61 Galaxie I had. The Ford had the largest engine, but I still get about the same mileage (14 m.p.g. after 1900 miles)."—Texas carpenter.

"My 250-hp. engine gets 11.3 m.p.g. over-all and I sold a 285-hp. '59 Dodge wagon that averaged 16.3 m.p.g. for 90,000 miles."—Michigan staff supervisor.

"The body surface is wavy."—Nebraska insurance agent.

There's a man on the line whose job it is to calm those waves with body solder.

"The transmission linkage is loose and I had a noise in the clutch."—New York aircraft service man.

"The Powerglide transmission isn't any good. It's been in the shop for over a month."—New Jersey fork lift operator.

(Please turn to page 238)

NEW **DYNAMIC** MARK 88
INDUSTRIAL TRANSFORMER ARC WELDER

ANYONE CAN WELD, BRAZE, CUT, SOLDER, HEAT ON STEEL, BRASS, ALUMINUM, AND OTHER METALS.

Build and repair anything of metal. Tremendous time and money saver. **THIS IS ALL BRAND NEW, PROFESSIONAL ARC WELDER!** Rugged metal cabinet, baked Hammerlold finish, ideal for home, shop, farm and industrial use. Expert work on your FIRST job. POWERFUL glass insulated transformer welds ½" metals with ⅛" rods. 4 heat settings, 20 to 80 amps. Operates on 110 Volt AC house line fused for 30 amps. Complete, ready-to-use—full head shield, electrode holder, ground clamp, cables, solder, assorted rods and simplified welding manual. Double-protection guarantee: 10-day money-back trial plus full 5-year warranty on materials and workmanship. **Order today: ONLY $47.50 (220V at $49.50).**

SEND ONLY $6.00

Only $47.50 Complete. Send only $6.00. Pay balance plus C.O.D. charges on delivery.

EASY PAY PLAN

Write for easy pay plan. LOW down payment — pay as you weld and earn.

DYNAMIC WELDER CO. DEPT. D2-B
1808 S. FEDERAL ST., CHICAGO, 60616

PAGE FOR TILLING PLOWING MOWING

A FULL LINE — 6-9-12 HP
with complete gear drive and reverse
FREE CATALOG • LOW PRICES • EASY TERMS
Over 40 years experience
OVER 60 ATTACHMENTS AVAILABLE!

PAGE Richfield 4 Wisconsin DEALERS WANTED

If you had to hang a
BABY ELEPHANT—
you could with the new
WELL-NUT®

An All-Purpose FASTENER—a modern Wall Anchor that holds in any wall—thick or thin. Ask your dealer or send 3 dimes for samples.

Daras—Rockwell Division
UNITED SHOE MACHINERY
455-V West Market St., Newark, N.J. 07101

To Make and Sell Ornamental Concrete Items
You Need **MOLDS**

For Thorough Info On Over 300 Different Molds You Can Buy And Use Plus Complete Start To Finish Professional Instructions
RUSH $2.00 for book

TURN CONCRETE INTO GOLD

CONCRETE MACHINERY COMPANY, INC.
839 Lenoir Rd. - P. O. Box 99 - Hickory 2, N. C.

FREE

WINDOW PLANNING IDEAS

to help you make your home more beautiful, more valuable. Send today for new, full-color folder packed with illustrated ideas and a complete description of the Andersen Window line.

(Clip and mail today!)

☐ I plan to build. PM-25
☐ I plan to remodel a_____.

Mr.
Mrs._____

Address_____

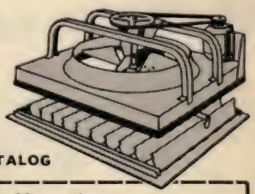
City_____ State_____

Andersen Windowalls AW®
TRADEMARK OF ANDERSEN CORPORATION
Andersen Corporation • Bayport, Minnesota

COOL YOUR HOUSE

FOR AS LITTLE AS
$117.75* WITH A
HUNTER ATTIC FAN

One or two speeds. Sizes to fit all homes. Easy to install. No special wiring required.**Suggested retail price (single speed) includes automatic ceiling shutter.*

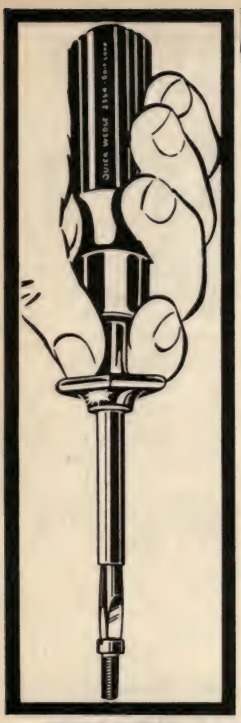


SEND COUPON FOR FREE CATALOG

Hunter Division, Robbins & Myers, Inc.
2726 Frisco Ave., Memphis, Tenn.—38114
Please send free catalog on Hunter Attic Fans to:

Name_____

Address_____



QUICK-WEDGE®

SCREW-HOLDING SCREWDRIVER

HOLDS THE SCREW

so firmly, the screw virtually becomes part of the screw driver, to help you

START THE SCREW

anywhere . . . even in hard to get at places, then . . .

DRIVES THE SCREW

straight, to save time, energy and your frayed nerves

Plus they're UNCONDITIONALLY GUARANTEED

Try one at your dealers or write

KEDMAN COMPANY, Box 267, Salt Lake City, Utah 84110

2,000 Hard-to-find **PRODUCTS** for easier...better woodworking!

Wood CATALOG & MANUAL

Discover! Enjoy! Benefit from newest products and ideas in Constantine's big picture-packed Manual. Wood headquarters since 1812. Largest selection of world's most beautiful cabinet lumber, veneers, plywood, inlays, moldings. *Woods in natural color.* Tool bargains. Furn. hdwe. Finishing & upholstery supplies. *Fabulous glue that needs no clamps!* Instructions. Everything. Unsurpassed values. Send 25¢ now for your copy. TEAR OUT AD

ALBERT CONSTANTINE AND SON, INC.
2050 Eastchester Rd., Bronx N.Y. 10461 Dept. B-5

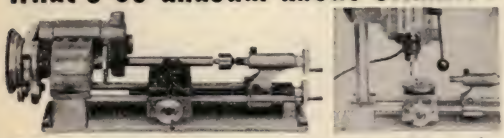
Enclosed 25¢ for new Constantine Catalog-Manual

MAIL AD

NAME.....

ADDRESS.....

What's so unusual about UNIMAT?



Its the only high precision metal-working lathe in the world that converts instantly into a sensitive drill press. 10,000 Unimat Owners also use their machines for milling and surface grinding. Attachments permit sawing wood, metal and plastics; polishing, tool sharpening and grinding. Price of complete basic machine is only $139.50. Write for Free Catalog, or read the whole story in "Miniature Machining Techniques" manual — only $1.00.

AMERICAN EDELSTALL INC., Dept. G-B5, 350 B'way, N.Y. 13, N.Y.

Owner's Report—Chevrolet

(Continued from page 236)

Owners have still more praises, however. Here's the last group, numbers 11 through 15, with the most popular first:

"I like the big, roomy trunk."—Iowa custodian.

"We can stand full bags of groceries up in the trunk."—Michigan checker.

That's quite an achievement since Chevy stylists decreed a semi-fastback line.

"I've had 35 years of driving Chevrolets. It's the most economical traveling salesman's car."—Pennsylvania retiree.

"I've owned three others and all were economical and dependable."—New York school crossing guard.

"The dash panel is the most beautiful Chevrolet has made."—Illinois clerk.

"You get the maximum in visibility."—Pennsylvania businessman.

Agreed—if you're looking forward.

"You sit up in it, so you see better."—Texas engineer.

"It's quiet running (although there's a little wind noise at high speeds)."—Michigan housewife.

Finally, here are samples from the last five groups of complaints with the most common first:

"It's a nuisance to have a separate key for the trunk."—Iowa farmer.

He doesn't turn his car over to a strange city parking attendant.

"The tires are too small."—Louisiana police chief.

"I don't like the instrument panel with only one ash tray."—Missouri mechanic.

"There's poor dash lighting and only one ashtray . . . and I can't find it at night."—retired Missourian.

We found the soft glow pleasant and instruments well illuminated. As for that ashtray, smoking passengers will just have to grow long left arms.

"The right rear shock dropped from the frame."—rural Illinois mail carrier.

"The right rear shock wasn't fastened to the body at the top (standing loose on the bottom mount)."—Pennsylvania personnel man.

"The instrument cluster isn't as sturdy as in the other Chevies I've owned."—Pennsylvania teacher.

"The dashboard comes up too high."—Michigan telephone installer.

There's the report from a panel of car testers who have racked up more miles than any others—the owners themselves. They totaled well over half a million miles to get the experience for this report. ★★★

Be free as the breeze for only $225.00*
Take a test ride on the new Harley-Davidson M-50. See your dealer today.
*Suggested retail, F.O.B. Milwaukee

RUPTURE!

An amazing Air-Cushion Invention allows body freedom at work or play. Light, neat, cool, sanitary. Durable, cheap. Day and night protection helps Nature support weakened muscles gently but surely. No risk. **Sent on Trial!** Write NOW for free Booklet and **Proof of Results.** All correspondence confidential.

Brooks Company, 346-B State St., Marshall, Mich.

Insist on

AMERICAN FLEX-FOLD All grades of Steel Wool Pads
HANDI-KIT 6 assorted Steel Wool Pads

At better hardware and paint stores—since 1896

BUY DIRECT • SAVE ON • TILLERS • TRACTORS

Full line of attachments for mowing, gardening, farming. FREE CATALOG & PRICE LIST

6-9-12 H.P.

4 wheel tractors

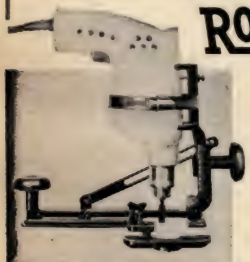
RED-E TRACTOR CO.
RICHFIELD, WISCONSIN
4th Street

Liquid WRENCH

LOOSENS RUSTED NUTS, BOLTS, PARTS IN SECONDS

at Service Stations, Auto and Hardware Stores

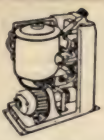
EVERY MAN WHO WORKS WITH WOOD NEEDS THIS ROUTERMATIC



Clamp this amazing new tool to your electric drill and you're ready to route, mortise, trim or shape wood to precision tolerances. Mortises for hinges made in seconds. Inside shapes and inlays are easy. Handles any kind of routing better by letting you take the tool to the work. Make mortise and tenon joints including mitre joints for picture frames. Perfect for fluting lathe work. Router-matic is a precision made tool, sturdy, light weight, portable. Once you've used it you'll wonder how you ever got along without it. Only $6.95 including $1.50 router bit. We can't sell thru stores at this low price. Fully guaranteed or money back. If you're skeptical write for descriptive folder.

COMP-TOOL, Inc.
355 Prospect Road Ashtabula, Ohio

GOVT. SURPLUS AND OTHER BARGAINS SAVE UP TO 90%



HYDRAULIC POWER PACK
Pump rated @ 3000 PSI, 1 GPM @ 1500 RPM. Complete unit incl. 1½ gal. reservoir, hydraulic fluid level sight gauge, 1 relief valve, one 5000 PSI pressure gauge, pump unloading valve and hi-pressure filter. Unit driven by 1½ HP electric motor, 200V, 400 cycle, 3 phase. Excellent condition. Approx. GOV'T COST $3250. Shpg. wt. 90 lbs. **$49.50.**

*Drive adapter available for driving pump from your own standard motor or engine. **$8.95**

DC JET GENERATOR Rated 400 AMPS continuous duty @ 30 V.D.C. 3000 RPM up. Will produce up to 600 AMPS at 48V. for intermittent periods. A truly fine gen. that will make an excellent welder. Mfg. by G.E. Approx. 16" L 7" dia. shpg. wt. 80 lbs. complete with wiring diagram. Approx. GOV'T cost $464. Completely Govt. rebuilt. Special, limited quantity **$39.95.**

NEW ELECTRIC PUMP WITH CONTROL UNIT
For boats, campers & trailers. Output 200 GPH. Variable rheostat with on & off switch controls output of pump. ½" pipe thread into bronze impeller housing.. 12 V.D.C. Explosion-proof const. Shpg. Wt. 9 lbs. Complete with wiring diagram. Approx. GOV'T COST, $200. NEW. **$10.95**

160-1 MOTORIZED REDUCTION GEAR Excellent for making your own winch or hoist, for beaching boats or as a golf cart or electric car drive unit. 1000's of other uses. Contains DC motor, clutch and reduction gear box. Easily reversible, wiring diagram furnished. Hi-torque runs on 6, 12 or 24 V.D.C. Turns approx. 75 RPM @ 12 v. Shpg. wt. 50 lbs. Approx. Gov't cost $300. Like new, tested prior to shipment. New low price **$17.50.**

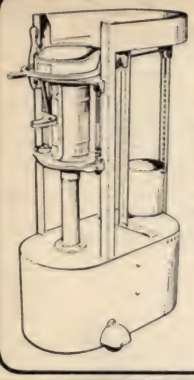
HEAVY DUTY BATTERY WINCH
Rugged, deluxe winch with ball bearing construction throughout motor & gear train. 225-1 gear reduction. Rated cap 3000 lb. pull. Contains reversing switch. Rugged ⅜" plate steel mounting base with outrigger support. 22" L x 9"W x 8" H. Handles 250' of ¼" cable. Built for 12V. battery operation; also operates on 6V. at reduced cap. & speed. A must for Scouts, Jeeps, Trucks, Boat loading trailers, etc. Shpg. wt. 80 lbs. Approx. GOV'T COST $490. NEW. 90-day guarantee. Model E-D. **$75.00** plus Fed. Tax of **$4.50.**

NEW! BIG! 1965 CATALOG
Send 25c for your copy of this new and amazing catalog containing 1000's of bargains in hydraulics, electric precision tools, marine items, automotive etc. for hobbyist or industrial. Order from this ad. All prices FOB Culver City, Calif. 50% deposit for COD. Send check, cash or money order.

AIRBORNE SALES CO. DEPT. PM265
8501 Stellar Drive • Culver City, Calif., Box 2727

NOW! DENTISTS HELP OVERCOME THE SHOCK OF NEW FALSE TEETH- WITH FASTEETH

When false teeth get on your nerves many dentists give special FASTEETH powder. It makes you feel more secure. It cushions tender gums so you can bite harder and eat faster with greater comfort. Use FASTEETH — be proud of your false teeth — laugh and speak more clearly without embarrassment. FASTEETH is alkaline (non-acid). Checks "plate odor" (denture breath). Wherever dental aids are sold—or write for free generous sample to 346 Wall St., Binghamton, N. Y.



Turns CONCRETE into DRAIN TILE

This machine's a MARVEL. Costs less than $500 and lets you make 100 or more top-quality tile per hour at a unit cost (including labor) of 4¢-5¢. Sell your tile at 10¢ to 15¢ each. **Earn extra or full income** making and selling a product that is in constant demand. Booklet with complete details free. Don't wait! Write for yours now.

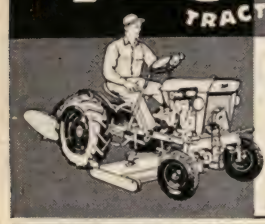
CONCRETE MACHINERY
Box 99, Hickory 2, N. Car. 28601

PLANER•MOLDER•SAW!

Now you can use this ONE **power-feed** shop to turn rough lumber into moldings, trim, flooring, furniture . . . ALL popular patterns. RIP . . . PLANE . . . MOLD . . . separately or all at once with a one HP motor. Use 3 to 5 HP for high speed output. Low Cost . . . You can own this power tool for only **$30.00** down payment.

Send postcard today for complete facts.
BELSAW POWER TOOLS, 905 Field Bldg., Kansas City 11, Missouri

ECONOMY TRACTOR DOES MORE KINDS OF JOBS



MAN SIZE TRACTOR AT GARDEN SIZE PRICE

Powerful! America's big tractor value. Low price. Rugged, built-in quality. Easy to operate. 9 to 12 hp. ALL GEAR DRIVE incl. clutch, 3-spd. trans., diff., 176 to 1 reduction. Wt. 790 lb. 25 low-cost, quick-change tools for farm, lawn, snow, woodland. Write for FREE CATALOG & dealer name.

Engineering Products Co.
1005 K-2 Anoka Ave., Waukesha, Wis.

TUNE-UP ANY CAR

New Automatic Tach-Dwell Tester Offers Quick, Easy Tune-ups, for Top Engine Performance, etc.

It's easy to keep any car in peak running condition. Fast, simple to use Tach-Dwell tests all engines, both foreign and domestic. 4, 6, 8 cylinders, 6 or 12 volts. Operates without batteries. No complicated controls or adjustments. Unit can even be left on car for road testing. SIZE: 6¼ x 3¾ x 2". Weight: 1 lb. Complete R.P.M. range 0-4000, 0-6000, 0-8000. Cam dwell angle 0-45°, 0-60°, 0-90°.

19.95 Direct from Factory

SAVE MONEY, ORDER DIRECT FROM FACTORY. ONLY 19.95 POSTPAID. GUARANTEED. NO C.O.D.'S. FREE LITERATURE.

GENERAL EQUIPMENT COMPANY
2951 VINELAND STREET, S. E., GRAND RAPIDS 8, MICH.

Owner's Report—Ford

(Continued from page 104)

—Indiana supervisor.

"Doors in the two-door are located so back seat passengers can get out."—Illinois professor.

Those big gates do make it easier on grandma's knee action.

"It has a good solid feel on the road."—Michigan salesman.

"It drives like a Lincoln without the extra $1500."—Missouri office worker.

"The power steering is improved a lot over my '62 Ford."—Illinois farmer.

"Power steering is almost perfect."—Indiana farmer.

It's fast and nearly effortless. A few owners reported leakage problems.

"You feel relaxed when you finish a long drive."—New York retiree.

"Much of my driving is done in mountainous country but I'm not beat when I get home at night."—New York salesman.

Gas mileage leads the second group of complaints— numbered 6 through 10. Here are representative comments, with samples of the most widespread listed first:

"Poor gas mileage, 10 m.p.g. in town with 250-hp. engine."—Michigan maintenance worker.

"Gas mileage . . . I only get 10 m.p.g. in town, 11 over-all with 250-hp. engine."—Louisiana secretary.

If her foot action is as feathery as her typing touch, she should get much better results.

"Low gear in the Cruise-O-Matic transmission went out in less than 500 miles. There was a defective piston."—Louisiana drug salesman.

"Cruise-O-Matic transmission leaks."—Texas inventory clerk.

Ford had some trouble near the radiator with transmission oil cooler hose, not the box. Better tell Henry.

"I lost power steering due to a loss of fluid from a fitting not tightened."—Michigan fan assembler.

"The power steering vibrates badly."—Michigan retiree.

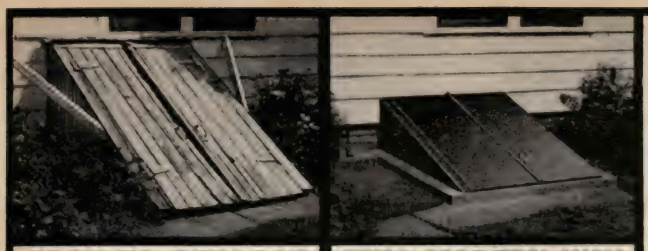
The steering pump is just above the transmission and both fluids are red. Be sure of the culprit.

"Wheel cylinder went out in my brakes."—Iowa insurance agent.

"Line to right rear wheel was loose and I lost brake fluid."—Washington truck fleet mechanic.

"It has an oil leak. They should tighten at least some of the bolts."—Iowa car-

Please turn to page 242)



EASY TO REPLACE THIS MODERN WAY

Bilco

AMERICA'S FINEST BASEMENT DOOR

Here's the way to add amazing new beauty and convenience to your home. Replace that troublesome wood door with a modern Bilco. All steel, permanent, watertight, opens and closes at a touch. A new Bilco Door will do wonders for your home . . . and for you!

The Bilco Co., Dept. R-62 New Haven 5, Conn.
Please send me your free illustrated folder and name of local dealer.

Name_____

Address_____

City_____ Zone_____ State_____

GUNK G·P

CLEANS POWER MOWERS GARAGE FLOORS

BRUSH IT ON HOSE IT OFF

AT HARDWARE, FARM AND AUTO STORES

BASEMENT TOILET FLUSHES UP

TO OVERHEAD SEWER OR SEPTIC TANK.
NO DIGGING UP FLOORS. INSTALLS EASY. Write
McPHERSON, INC. BOX 15133 TAMPA, FLA.

POLYSEAMSEAL®

TUB CAULK • TILE ADHESIVE
Pure White • Elastic
Permanent
Sticks like glue! 101 Household Uses!
L. W. FERDINAND & CO., INC., SIMSBURY, CONN.

ELECTRIC ARC WELDER $14.95!

MAKE—REPAIR MOST ANYTHING MADE OF METAL!
LIFETIME BURNOUT GUARANTEE—10 day money back trial!

Works on 110 volt plug in 10 WAYS! WELDS, BRAZES, SOLDERS, CUTS, MELTS most ALL metals! HEATS, SOFTENS, LOOSENS, THAWS, BENDS most ANYTHING. COMPLETE READY TO USE WITH face mask, clamps, arc torch, rod holder cables—and supply of welding, brazing carbon, solder rods, flux and ARC WELDING INSTRUCTION BOOK—Tells how YOU can use for CARS—HOME—FARM—SHOP or FACTORY all 10 WAYS—NO EXPERIENCE NEEDED!

SEND ONLY $2.00 (cash, ck, M.O.) and pay postman $12.95 plus COD postage or send $14.95 for PP del. in USA. BEST WELDER FOR THE MONEY IN THE WORLD. FREE: EXTRA "Helpers" dark goggles if you order from this ad. Sold ONLY by MIDWAY WELDER, Dept. DPM-2, Kearney, Nebraska.

NOW! WARN OVERDRIVE gives 'Jeeps' more Go!

New approved accessory cuts engine RPM 33% at any speed, reduces noise, vibration so you can drive your Jeep 4-w.d. comfortably at freeway speeds. Amazing synchromesh OD lets you shift up or down, on the go, anytime, in any gear, at any speed. Adds six forward speeds, two reverse. At Jeep dealers, or write us.

WARN SALES CO., Inc.
9050-A Empire Way South
Seattle, Washington 98118

Shrinks Hemorrhoids New Way Without Surgery Stops Itch – Relieves Pain

For the first time science has found a new healing substance with the astonishing ability to shrink hemorrhoids and to relieve pain — without surgery.

In case after case, while gently relieving pain, actual reduction (shrinkage) took place.

Most amazing of all — results were so thorough that sufferers made astonishing statements like "Piles have ceased to be a problem!"

The secret is a new healing substance (Bio-Dyne®) — discovery of a world-famous research institute.

This substance is now available in *suppository or ointment form* under the name *Preparation H®*. Ask for it at all drug counters.

STARCRAFT® 65

new fishing boats—every inch keepers!

Starcraft '65 measures its fishing boats just as you measure a fish. A straight line down the center from bow to stern. Centerline length. Some people measure boats by gunwale length—which is like measuring a fish by half its circumference. Doesn't make sense. For greater values, choose from Marlin, Super Duty, Seafarer, and Sea Scamp. 12 to 16 ft. Write for free '65 catalog. Starcraft Boat Company, Dept. PM-2, Goshen, Indiana.

ELECTROPLATING
EQUIPMENT, SUPPLIES and INSTRUCTIONS
for Home Workshop or Production Plant

Decorative Chrome, Hard Chrome, Precious Metals (Decorative & Electronics), Electro Polishing, Baby Shoe Metalizing and all other finishes. Also Portable Platers & Sample Plating Service. Send $1 (refundable) for formulas, operating data and catalog.

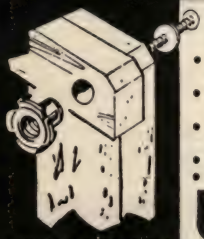
HBS Equipment Division - Dept. 165
3445 Union Pacific Avenue. Los Angeles 23. Calif.

U. S. Oil & Gas Lease Drawing
PUBLIC POSTING
By Government Regulation

EQUAL OPPORTUNITY TO WIN valuable oil leases in United States Government public drawings monthly by U. S. citizens. Winners awarded oil leases in prolific producing areas promptly salable for large profits. Our clients winning—one put up $60 and sold for $7800.00 cash. For amazing information and how to share write:

Federal Oil Lease Service
Box 867-PM Ft. Worth 1, Tex.

FAMOUS DOT TEENUT® FASTENERS



- Can't slip, flush-mounted, strong. ONLY nut that gives steel threads in wood!
- Now available in bright NEW finish!
- NEW red and yellow, skin-pack cards!
- Look for colorful NEW display carton, too!
- Handymen need TEENUTS!
- Sold at hardware stores.

COLUMBIA FASTENER
SUBSIDIARY OF UNITED-CARR
3229 South Ashland Avenue
Chicago, Illinois 60608

TEENUTS is a registered trademark of United-Carr

ALUMINUM SIDING

Learn how you can earn up to $1000.00 per sale, showing our quality aluminum siding on your home.

TO: ALUMINUM INDUSTRIES, Dept. P-25
KANSAS CITY 11, MISSOURI
Please send me complete information
My Name_____
Street_____
City_____ State_____

Owner's Report—Ford

(Continued from page 240)

penter.

"I've had an oil leak."—Maryland sheet metal worker.

Starting with the references to good vision, here are samples from the last group of five Ford features owners liked:

"Better vision now that the hood is lowered."—Minnesota housewife.

Virtually every point on the hood is in your line of sight, too.

"The vision is okay forward and rear."—Missouri locomotive engineer.

"Holds the road well at 70 m.p.h."—Michigan moulding machine operator.

"I like 15-inch wheels instead of 14s."—New York electronic technician.

"The 15-inch tires will wear longer."—Michigan rural mail carrier.

Remains to be seen. The new low profiles have about the same rolling radius, circumference, and revolutions per mile as the old tire sizes.

"Riding quality is comparable only to sitting in your living room in your favorite chair."—Pennsylvania warehouseman.

"The bucket seat are well-formed."—Illinois inspector.

"All the gauges and controls are handy."—Indiana steelworker.

"I like the consolidation of instruments."—Missouri housewife.

An unusually wide brake pedal stimulated the most widespread of the last group of five complaints. Other owners were unhappy with the new rear suspension, dust leaks, and trouble with the carburetor and electrical system. Here are representative comments:

There's hardly room to pivot your foot from gas to brake, sad to say.

"The brake pedal is too close to the gas."—Pennsylvania mechanic.

"The rear springs are too light for the load I haul."—Indiana supervisor.

"Dust filters in freely on dirt roads, especially at bottom of the doors."—Texas attorney.

"Dust gets into the trunk and then on into the car."—Ohio line repairman.

"Pop back through the carb caught fire and burnt up air filter."—Ohio industrialist.

"Carburetor was lacking a part."—Maryland local union president.

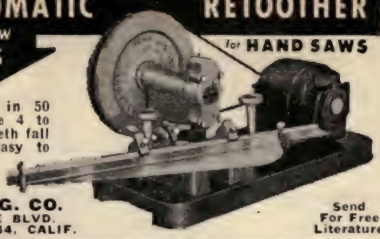
"Had a defective voltage regulator."—Ohio physics professor.

"Electrical circuits not completed to minor accessories."—New Jersey chemist.

Those are the reactions after we asked a thousand owners what they thought of their new Fords. Their experience is provided for your help. ★★★

AUTOMATIC RETOOTHER for HAND SAWS

MAKES NEW PROFITS



Cuts new teeth in 50 seconds—any size 4 to 16 points. Old teeth fall off as chips. Easy to operate. A perfect job.

BURR MFG. CO.
8933 VENICE BLVD.
LOS ANGELES 34, CALIF.

Send For Free Literature

SCUFFED FLOORS? SEND FOR FREE SAMPLE

Removes heel marks, stains, adhesive from asphalt, vinyl, vinyl asbestos. Send name of hardware or linoleum dealer.

MY-RO TILE CLEANER & ADHESIVE REMOVER

MY-KO CHEMICAL CORP., Dept. PM
1736 N. Second St., Milwaukee, Wis. 53212

MOTOR-MEDIC

- REDUCES ENGINE WEAR
- MAKES OIL LAST LONGER
- STOPS OIL BURNING

At Service Stations and Auto Supply Stores

PROTECTS TOOLS, SORTS THEM NEATLY

HUOT TOOL CHEST

Keeps tools organized. 4 sliding drawers, rugged steel Professional Style cabinet—blue or red —26" x 12¼" x 12¼". Write for FREE BULLETIN on this and 15 other models.

HUOT MFG. CO. 555 N. WHEELER ST., ST. PAUL 4, MINNESOTA MODEL 107

BIG CATALOG! FREE DECAL

BIKES • KARTS • PLANS • PARTS

Save up to 50% on karts, scooters, mini-bikes! Plans, drawings, parts, engines, clutches, wheels, helmets, etc. — plus ready-to-ride units . . . all at factory prices! Build it yourself at home! Order catalog now — get free decal!

Go Kart SEND $1.00 BOX 797P Janesville, Wis

NOW! GET 3 REAL OLD LINCOLN CENTS — for only 10¢

Only 10¢ brings you 3 old Lincoln pennies – America's most sought-after collector's coin. 1929S, 1916, 1918. (Offer limited – only one set to a customer.) For all 3 Lincoln Cents, plus free catalog illustrating coins and supplies, plus other offers on approval, send name, address and 10¢ to LITTLETON COIN CO., Dept. PM-2, Littleton, New Hampshire 03561.

BEST LOW COST ELECTRIC WELDER MONEY CAN BUY ONLY $14.95

SEND ONLY $2.00

You Get: FULL FACE SHIELD, heavy metal cabinet, ground clamp, 12 ft. of heavy duty welding cables, twin carbon arc torch, rod holder, carbons, welding and brazing rods, flux, solder, instructions. SEND ONLY $2.00. Pay $12.95 plus C.O.D. charges on delivery or send only $14.95 and we will ship prepaid. Order today.

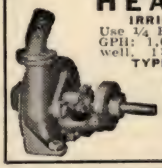
5-YEAR GUARANTEE
10-DAY MONEY BACK TRIAL. WELDS, BRAZES, SOLDERS, CUTS ANYTHING OF METAL

No comparison for performance and value. No experience needed to make or repair auto bodies, fenders, trailers, boats, furniture, farm equipment, garden tools, anything of metal. Use up to ⅛-in. welding rods and ¼-in. carbons on up to ¼-in. metal. Operates on any 110 V. line. **WORLD'S GREATEST WELDING VALUE.** Over 500,000 in use by home owners, farmers, hobbyists, mechanics. **5-Year unconditional guarantee.** Order on 10-day moneyback trial, if not satisfied return for refund.

FOUR-WAY WELDER CO.
DEPT. W2-B, 1810 S. FEDERAL ST., CHICAGO 60616

EXCLUSIVE DOUBLE-BEARING HEAVY DUTY PUMPS

IRRIGATE • DRAIN • CIRCULATE • SPRAY



Use ¼ HP motor or larger . . . 1 HP for up to 5,200 GPH; 1,000 GPH 60' high; or 3,000 GPH from 25' well. 1¼" inlet; 1" outlet. Stainless shaft.

TYPE X—2 oil-less bronze bearings. Won't rust $10.95

TYPE XB—Ball bearing model. Best for belt drives . . . $12.95

Postpaid if cash with order.
Don't delay—send for yours today!
MONEY BACK GUARANTEE
Centrifugal and Gear Pumps in All Sizes
LABAWCO PUMPS, Belle Mead 2, N. J.

SAW SHARPENING IS EASY

FREE LITERATURE

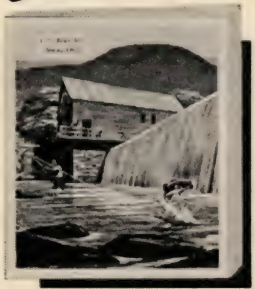
Super Filer No. 11 joints and sharpens hand and circular saws 6" to 10" with all teeth correct in height, depth, pitch, bevel. When file hits steel roller, teeth are finished. Saw runs true with no side pull. Includes 8" file. $9.95 PPD.

"TRU-CIRCLE" saw set automatically sets teeth at 10° or more. $2.95 PPD.

MONEY BACK GUARANTEE

A. D. McBURNEY, 1610 Victory Blvd., Glendale, Calif. 91201, Dept. A-25

Bean's Free Spring Catalog



Ready February 15

Fully illustrated 100 pages of camping specialties, fishing tackle, clothing and footwear for men and women. Featuring practical outdoor items, many of our own manufacture.

L.L.Bean, Inc.
247 Main St., Freeport, Maine 04032
Hunting, Fishing and Camping Specialties

PHIL RIZZUTO . . . Radio Network Sportscaster and Former Yankee Shortstop DISCOVERS A RICHLY REWARDING NEW NATIONAL PASTIME!

"There's a new indoor pastime I'd been introduced to recently that has me wondering where it's been all my life. Until I outfitted the basement of my new home with a set of American Machine power tools, I had no idea how much fun it could be to make things out of wood—nor how easy it can really be. I am constantly amazed with the accuracy, speed and ease with which I can now make useful and beautiful things for the house, for the kids—and for my own pleasure and convenience. I don't know how they do it, but the remarkable low cost of these professional quality tools has taken nothing away from their ability to do a job."

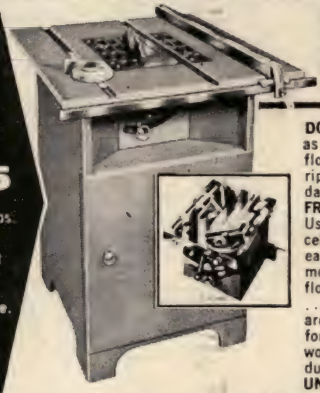
BUY DIRECT FROM OUR FACTORY Amco POWER TOOLS SAVE AS MUCH AS 80%

8" TILT ARBOR POWER SAW

$14.95

f.o.b. factory. Wt. 25 lbs.

Includes completely assembled cast iron and steel 8" tilt arbor power saw with ground cast iron table . . . less blade. If desired, RIP FENCE for easier work alignment, $3.50 additional



REVOLUTIONARY PATENTS DECREASE COSTS, INCREASE EFFICIENCY
Full scale power tools of heavy duty 100% cast iron and steel. Streamlined design reduces weight, cuts material and production costs. Special patents provide added efficiency, accuracy, savings. Parts made, assembled, tested and packed right in our own factories, shipped direct . . . save store profits.

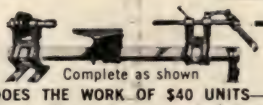
DOES WORK OF $75 BENCH SAW as is. Converts easily to equal any $300 floor model cabinet units! Crosscuts, rips, mitres, cuts compound angles, dadoes, makes coves and mouldings.
FREE CABINET BASE PLANS
Use as portable bench saw as received (inset photo) . . . or transform easily and inexpensively into floor model (as shown) guar. to do work of floor models costing $300. FREE plans . . . sheet of ¾" plywood and 3-4 hours are all you'll need. Use your AMCO saw for cutting. Plans provide 27" x 24" work surface, 33" height, pullout sawdust bin, tool storage compartment.
UNCONDITIONAL 10 YEAR GUARANTEE

BLADE TILTS . . . TABLE STAYS LEVEL
• Locks securely at any angle to 50°, raises, lowers 0"-2¼" • Patented tilt mechanism, accurate etched scale • Patented motor mount takes std. ¼ h.p. or larger motor, keeps belt tight, assures perfect alignment at any angle, transmits full power • Takes std. blade, saw insert removes to take dadoe heads, cutters, etc. (not incl.) • Accurate mitre gauge assembly • Ground spindle • Enclosed steel base • "Compo" bearings • Accessories available at factory prices • RIP FENCE, if desired for easier work alignment: Std. size (for bench saw) $3.50; larger fence (for cabinet base, as ill'd.) $4.50.

6" SWING 3-FT. LATHE

$98.50 f.o.b. factory

Optional Faceplate for turning bowls, trays, lamp bases, rosettes, etc. $2.50



Complete as shown

DOES THE WORK OF $40 UNITS—
Sturdy all cast iron power tool turns wood or plastics with the precision and speed of machines selling for 4 times as much. Tubular steel bed, ball thrust cup center, spur center. T-Rest assembly, lever action tail stock. 2 speed pulley. Fits any motor.
UNCONDITIONAL 10 YR. GUARANTEE

PROVED BY MORE THAN 500,000 USERS

FULL 22" LONG, 4⅛" JOINTER-PLANER

$19.95 F.O.B. Factory Complete as shown

100% precision ground cast iron and steel.

DOES WORK OF $60 UNITS
Now, at little more than a hand tool price, a guaranteed professional quality precision machine which does same work as skilled hand planing . . . much faster, more accurately. Make accurate glue joints; rabetting cuts for doors, window frames, table drawers; square taper cuts for chair legs; accurate beveling.

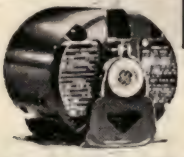
• Precision ground cast iron tables, adjustable for depth of cut • Rigid cast iron base • New patent-pending design holds clearance between knives and tables at any depth • Rabett depth ⅜" • Hardened, ground high speed steel knives • Patent-pending fence adjustable to any position, any angle 0°-50° • Patent pending lift-off guard (nothing to loosen!) • Balanced steel cutter head. **UNCONDITIONAL 10-YEAR GUARANTEE.**

OR 1/2 HP ELECTRIC MOTOR

SPECIAL AMCO PRICE (when purchased with any unit in this ad)

$12.95 f.o.b. factory

If purchased separately, $18.95



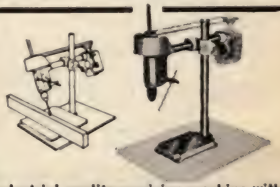
SPECIAL LIMITED TIME ONLY
Brand new factory-fresh motors for use with any of the units on this page. Limited quantity purchase . . . first come, first served. Wt.: 17 lbs.
FULL 1-YEAR WARRANTY

32" RADIAL DRILL PRESS

$29.95 F.O.B. Factory

½"Cap. Jacob's Chuck Inc. Shipping Wt. 30 lbs.

DOES WORK OF $90 UNITS . . . AND A GREAT DEAL MORE



Industrial quality precision machine with all features of standard drill press, many extras. Head raises, lowers. Greatly increased depth of throat. Can be pre-set to any angle or position for on-or-off table drilling . . . even horizontal drilling. All cast iron and steel. UNCONDITIONAL 10 YEAR GUARANTEE

MAIL COUPON TODAY!

AMERICAN MACHINE & TOOL CO., Dept. PM. 25B, Royersford Pa.

Please send me the units checked. Payment in full enclosed $..... or $3 deposit each item enclosed, balance C.O.D. ☐ I MUST BE FULLY SATISFIED OR WILL RETURN UNIT WITHIN 10 DAYS FOR FULL REFUND. No questions asked.

☐ 8" Power Saw at $14.95 ☐ Jointer-Planer at $19.95
☐ Long Rip Fence #354C at $4.50 ☐ Drill-Press at $29.95
☐ Standard Rip Fence #354 at $3.50 ☐ Lathe at $9.85
1/2 hp Motor: ☐ $18.95 (if purchased separately) ☐ $12.95 (if purchased with other item) with faceplate $12.35 ☐

NAME .....
ADDRESS .....
CITY ..... ZONE ..... STATE.....
(please print)

10 DAY MONEY BACK GUARANTEE
You must be satisfied or money refunded.
AMERICAN MACHINE & TOOL COMPANY
Dept. PM-25B, Royersford, Pa.

Noiseless portable

A few words about quiet.

Every motor manufacturer makes a lot of noise about quiet. But the Sportwin does for boating what the noiseless typewriter did for typing. If it's quieter than an Evinrude . . . it isn't running.

And a word about portability.

You never hefted a handier package of power than this. A suitcase-type lifting handle is at the point of balance. The Sportwin weighs in at 60 pounds. Not bad for 9½ horses, complete with full gearshift, thermostat controlled cooling, etc.

It's short enough to tuck snuggly into compact car trunks — only 34 inches, top to skeg.

This sporty little shorty packs a wallop. Planes fishing boats at a 20-mile clip. Runs 80 miles or more on a 6-gallon tank.

It tilts and locks in 16 different running positions for shallow water trolling. The handle tilts up for stand-up trolling. Or down for stowing.

We only made one mistake in building the Sportwin last year.

We didn't build enough to meet the demand.

See the Sportwin at your Evinrude dealer, listed in the Yellow Pages. Free catalog. Write Evinrude Motors, 4042 N. 27th St., Milwaukee, Wisconsin 53216.

EVINRUDE

FIRST IN OUTBOARDS

MILWAUKEE, WISCONSIN 53216

DIVISION OF OUTBOARD MARINE CORPORATION

GOOD DAY. QUIET MOMENT. TIME FOR A CAMEL.

Camel Time is flavor time!

Time for easygoing taste...honest enjoyment ...choice quality tobaccos. Compared to any cigarette, Camel has the best taste of all. Make it Camel Time right now!

THE BEST TOBACCO MAKES THE BEST SMOKE!

© 1965
R. J. Reynolds
Tobacco Company
Winston-Salem
North Carolina

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS 75th YEAR

BOX 394, SCRANTON, PENNA. 18515

Without cost or obligation, send me the Success Kit for the course checked.

ARCHITECTURE and BUILDING TRADES
- ☐ Air Conditioning
- ☐ Architecture
- ☐ Arch. Drawing
- ☐ Building Contractor
- ☐ Carpentry & Millwork
- ☐ House Planning
- ☐ Painting
- ☐ Plumbing & Heating

ART and DESIGN
- ☐ Commercial Art
- ☐ Interior Decorating
- ☐ Illustrating
- ☐ Sketching and Painting

AUTOMOTIVE
- ☐ Auto Electric Technician
- ☐ Automotive Mechanic
- ☐ Engine (Gas & Diesel)
- ☐ Engine Tune-up
- ☐ Transmission Specialist

BUSINESS
- ☐ Accounting
- ☐ Cost Accounting
- ☐ Practical Accounting
- ☐ Bus. Administration
- ☐ Executive Training
- ☐ Marketing
- ☐ Personnel-Labor Rel'ns
- ☐ Programming for Digital Computers
- ☐ Purchasing Agent
- ☐ Real Estate
- ☐ Salesmanship
- ☐ Sales Mgmt.
- ☐ Small Business Mgmt.
- ☐ Traffic Mgmt.

CHEMICAL
- ☐ Analytical Chemistry
- ☐ Chem. Engineering
- ☐ General Chemistry
- ☐ Lab. Technician
- ☐ Nuclear Energy
- ☐ Plastics ☐ Pulp, Paper

CIVIL ENGINEERING
- ☐ Civil Engineering
- ☐ Highway Blueprints
- ☐ Highway Engineering
- ☐ Structural Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Engineering
- ☐ Surveying & Mapping

DRAFTING
- ☐ Architectural
- ☐ Drafting Technology
- ☐ Electrical—Electronic
- ☐ Mechanical

ELECTRICAL
- ☐ Appliance Servicing
- ☐ Electrical Engineering
- ☐ Elec. Motor Repairman
- ☐ Instrument Technician
- ☐ Practical Electrician
- ☐ Practical Lineman
- ☐ Telemetering

ELECTRONICS
- ☐ Automation
- ☐ Electronic Computers
- ☐ Electronics Technician
- ☐ General Electronics
- ☐ Hi-Fi Stereo and Sound Systems
- ☐ Industrial Electronics

ENGINEERING (Professional)
- ☐ Chemical ☐ Civil
- ☐ Electrical ☐ Mechanical

ENGLISH and WRITING
- ☐ Business Writing
- ☐ Technical Writing
- ☐ Practical English

HIGH SCHOOL (Diploma)
- ☐ High School Business
- ☐ High School General
- ☐ High School Math
- ☐ High School Secretarial
- ☐ High School Vocational
- ☐ College Preparatory

LANGUAGES (Edited by Berlitz)
- ☐ French ☐ German
- ☐ Italian ☐ Spanish

MECHANICAL and SHOP
- ☐ Gas-Elec. Welding
- ☐ Industrial Engineering
- ☐ Ind. Instrumentation
- ☐ Machine Design
- ☐ Machine Shop Practice
- ☐ Mech. Engineering
- ☐ Safety Engineering
- ☐ Shop Blueprints
- ☐ Tool Design
- ☐ Toolmaking

SECRETARIAL
- ☐ Clerk-Typist
- ☐ Legal Secretary
- ☐ Medical Secretary
- ☐ Professional Secretary
- ☐ Shorthand
- ☐ Stenographic ☐ Typist

STEAM and DIESEL POWER
- ☐ Boiler Inspector
- ☐ Power Plant Eng.
- ☐ Stationary Engineering
- ☐ Steam Engineering

SUPERVISION
- ☐ Foremanship—Supvr'n
- ☐ Personnel—Lab. Rel'ns

TV-RADIO
- ☐ Radio and TV Servicing
- ☐ Radio-Tele. License
- ☐ TV Technician

MISCELLANEOUS
- ☐ Textile
- ☐ Other (please specify)

_____

Name_____ Age_____

Home Address_____

City_____ State_____ Zip Code_____

Occupation_____

Employed by_____ Working Hours_____ A.M. to_____ P.M.

FREE I.C.S. SUCCESS KIT

Check the course of study that interests you. I. C. S. will send you the latest catalog outlining the job and training opportunities in that field. In addition, you will get an actual lesson demonstrating the success-proved I. C. S. method. Both are free.

Also sent free when you mail this card

"How to Succeed"—The remarkable new booklet that tells how success can be yours. A few highlights:

- Self-evaluation charts
- Your motives
- You in review
- Your "master plan"
- Selecting your career
- Your boss and success
- Why people fail
- How to get ahead faster

Accredited Member, National Home Study Council

Write for new W. I. C. S. package for women

Low rates to members of U. S. Armed Forces!

Special training programs for industry

INTERNATIONAL CORRESPONDENCE SCHOOLS ICS 75th YEAR

IMPORTANT

!!!!!!!! Mailing this postcard can be the most profitable venture of your life. $$$$$$$$$

You get the famous I. C. S. Success Kit without obligation and at absolutely no cost—not even the few cents for a stamp! Tear off card right now!

FIRST CLASS
PERMIT
NO. 1000
SCRANTON, PA.

BUSINESS REPLY MAIL. No postage stamp necessary if mailed in United States

POSTAGE WILL BE PAID BY—

International Correspondence Schools

Scranton, Penna. 18515

FREE

Big 228-Page CATALOG of Auto Parts and Accessories

Rush This Card Today!

UP TO **40%**

FROM ALL PREVIOUS CATALOGS

Brand-new, value-packed 228-page J. C. Whitney Catalog now **saves you more than ever before** on all your automotive needs! It contains the world's largest selection of parts and accessories (all fully guaranteed) for every car, truck, station wagon, hot rod, custom car, dragster . . . PLUS foreign and sports cars . . . PLUS hard-to-find items for Model "A" and "T" Fords. You **SAVE MONEY** on every item because our tremendous buying power and huge volume enable us to cut prices to rock-bottom. What's more, this catalog doesn't cost you a penny!

J.C. WHITNEY & CO.
1917 Archer Ave., Chicago, Ill. 60616, *Dept. TP21*

J. C. WHITNEY & CO.
1917 Archer Avenue DEPT. TP21
Chicago, Illinois 60616

Please rush me—absolutely FREE and without any obligation whatsoever—your GIANT MONEY-SAVING AUTOMOTIVE PARTS AND ACCESSORIES CATALOG. This offer good in U.S.A. and possessions only.

NAME_____
(Please Print)

ADDRESS_____

CITY_____

STATE_____ **ZIP CODE**_____

POST CARD

PLACE 4c STAMP HERE

J. C. WHITNEY & CO.
1917 Archer Avenue
Chicago, Ill. 60616

RUSH THIS CARD TODAY!

FREE

AUTO PARTS & ACCESSORIES CATALOG

New Lower Price Policy Saves You More Than Ever!

Get your copy of this just-out 1965 automotive buyers guide . . . see for yourself how Whitney helps you **SAVE MONEY ON ALL YOUR AUTO PARTS AND ACCESSORIES NEEDS!** No matter what make year, or model of car or truck you drive . . . your're sure to find exactly what you need in the tremendous selection of over 100,000 items this Whitney catalog offers.

See the latest in Hollywood and Custom equipment, just-out hi-speed and racing parts, helpful books and manuals, as well as hard-to-find replacement parts for all cars. And, every item Whitney sells carries a **money-back guarantee of satisfaction!**

SEND FOR THIS BOOK TODAY—IT'S FREE!
J. C. WHITNEY & CO.,
Chicago, Ill. 60616

JUST FILL OUT AND MAIL TODAY

NO JINGLES!

NO BOX TOPS!

NO SENTENCES TO COMPLETE

P 292312

(Please Print)

NAME _____

ADDRESS _____

TOWN _____ STATE _____ ZIP CODE _____

4-784

ONLY For Readers of POPULAR MECHANICS

$100,000.00 in FREE PRIZES

offered by *Beltone*®

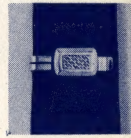
THIS LUCKY NUMBER may win one for you

CHOOSE YOUR FREE PRIZE FROM ANY OF THESE NEWEST BELTONE MODELS

Beltone's "FRONTEAR" Hearing Glasses

Beltone's "UTOPIAN" In-the-ear Hearing Aid

Beltone's "SERENADE" Behind-the-ear Hearing Aid



Beltone's "TRIUMPH" Body-worn Hearing Aid

ONLY For Readers of POPULAR MECHANICS

HAVE YOU ALREADY WON A...

FREE *Beltone* HEARING AID?

Just Mail In This Lucky Number Card!

Fill out the card with *your* name and address if *you* are hard-of-hearing or with the name and address of a hard-of-hearing friend or loved one.

Mail this postage-paid Lucky Number Card today or take it to the friendly Beltone Hearing Aid Specialist in your community. (Check your phone book yellow pages under "Hearing Aids" for office nearest you.) Your number will be checked against the list of winning numbers, and you will be advised promptly if you have won. All cards must be in by midnight March 31, 1965.

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY MAIL
First Class Permit No. 29923, Chicago, Illinois

Postage Will be Paid by Beltone

Beltone®
4201 W. Victoria Street
Chicago, Illinois 60646

Send for your FREE 1965 **HEATHKIT®** Catalog today!

Heathkit . . . world's largest electronic kit line—now bigger and better than ever!

- bigger selection—over 250 kits!
- greater savings—up to 50%!
- unmatched quality!

MAIL TODAY!

PLEASE SEND MY FREE 1965 HEATHKIT CATALOG

Name _____ (Please Print)

Address _____

City _____ State _____ Zip _____

17-2

There's something for everyone

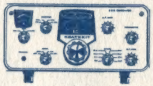
in the new

HEATHKIT CATALOG

— truly the finest selection and savings ever offered kit builders!

STEREO/HI-FI EQUIPMENT . . . Changers, tuners, amplifiers and speakers—tube type or all-transistor—mix or match for the finest in stereo listening at savings of up to 50%!

FOR THE SPORTSMAN & HOME OWNER . . . Heath offers the widest selection of radios, intercoms, walkie-talkies, citizen's band radios, television and electronic organs at big kit savings.



HAM RADIO EQUIPMENT . . . Choose from a complete selection of transmitters, receivers and accessories recognized by hams the world over for quality.

ELECTRONIC TEST EQUIPMENT . . . For work or workshop, engineers & technicians rely on quality-design, economical Heathkit test gear.

MARINE GEAR . . . Direction finders, depth sounders, tachometers, power converters and radiotelephones to outfit your boat for safe cruising—economically!

Send for your **FREE** Heathkit Catalog now!

PLACE 5c STAMP HERE

HEATH COMPANY

Benton Harbor, Michigan 49023